

GAO

Report to the Honorable  
George E. Brown, Jr., House of  
Representatives

July 1991

# NUTRITION MONITORING

## Mismanagement of Nutrition Survey Has Resulted in Questionable Data



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United States  
General Accounting Office  
Washington, D.C. 20548

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Resources, Community, and  
Economic Development Division

B-243089

July 26, 1991

The Honorable George E. Brown, Jr.  
House of Representatives

Dear Mr. Brown:

As you requested, we examined certain aspects of the 1987-88 Nationwide Food Consumption Survey, a decennial survey conducted by the Human Nutrition Information Service, U.S. Department of Agriculture. This report makes several recommendations to the Secretary of Agriculture to correct data quality problems in the 1987-88 survey and improve methodology and contracting procedures in future surveys.

As arranged with your office, unless you publicly announce its contents earlier, we will make no further distribution of this report until 10 days from the date of this letter. At that time, we will send copies of this report to the appropriate House and Senate committees; interested Members of Congress; the Secretary of Agriculture; the Administrator, Human Nutrition Information Service; the Administrator, Food and Nutrition Service; and the Director, Office of Management and Budget. We will make copies available to others upon request.

This work was performed under the direction of John W. Harman, Director, Food and Agriculture Issues, who may be reached on (202) 275-5138 if you or your staff have any questions. Other major contributors are listed in appendix IV.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'J. Dexter Peach'.

J. Dexter Peach  
Assistant Comptroller General

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# Executive Summary

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## Purpose

Concerns about food safety and the nutritional status of the U.S. population point to the need for reliable, timely information on food use and the dietary habits of Americans. The Department of Agriculture's (USDA) Nationwide Food Consumption Survey, conducted most recently in 1987-88, is considered a major government survey on food and nutrient consumption. As requested by Representative George E. Brown, Jr., GAO examined (1) certain aspects of the methodological soundness of the 1987-88 survey and (2) the effectiveness of USDA's management of the contractor hired to conduct the survey.

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## Background

The Nationwide Food Consumption Survey, which is conducted once each decade, addresses two aspects of food consumption: household food use, measured over 7 days, and individual food use (intake), measured over 3 days. The survey relies on three instruments for collecting data—one for household and two for individual consumption. These instruments combine structured in-person interviews with a self-administered questionnaire. According to a 1984 study by the National Research Council, the survey is widely used. The Food and Nutrition Service (FNS), for example, uses the data to evaluate multibillion-dollar federal food assistance programs.

The purposes of the 1987-88 survey included evaluating the nutritional content of household and individual diets and detecting shifts in food use since the 1977-78 survey. The survey, conducted in the continental United States, comprised a "basic" sample, which was to cover at least 6,000 households of all incomes, and a low-income sample, which was to cover at least 3,600 households. Both samples were meant to be representative of the U.S. populations from which they were drawn.

The contract for the survey was awarded in September 1986 for \$6.2 million, with completion expected in March 1989. USDA's Human Nutrition Information Service (HNIS) and FNS shared responsibility for overseeing the contractor, National Analysts. The HNIS contracting officer's representative was responsible for monitoring National Analysts' performance and notifying FNS' contracting officer about any problems. Authority to change the contract's work, costs, or completion dates and to enforce the contract's provisions rested with FNS' contracting officer.

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## Results in Brief

Methodological problems, deviations from the survey's original design, and lax controls over the collection and processing of the results all raise doubts about the quality and usefulness of the data in the 1987-88

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Nationwide Food Consumption Survey. Most importantly, results from the survey may not be representative of the U.S. population because of low response rates. During its review, GAO had raised concerns that the data might be biased. In April 1991, an expert panel convened by HNIS to assess the integrity of the 1987-88 data concluded that the data may be biased estimates of the nation's dietary intake.

HNIS and FNS poorly managed the contract for 1987-88 survey, at times violating key internal controls designed to safeguard the government's best interests. The contracting officer's representative improperly approved changes without consulting the contracting officer. The contracting officer exercised no oversight during much of this time. As a result, the contractor did not complete key procedures required by the contract. These actions contributed to increasing the contract's costs and delaying the contract's completion by 2 years.

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## Principal Findings

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### Poor Survey Methodology Compromised Data's Quality

The most serious data quality problem in the 1987-88 Nationwide Food Consumption Survey resulted from the low response rate for the basic sample: Only 34 percent of the households in the basic sample provided individual intake data—a response rate so low that it is questionable whether the data are representative of the U.S. population. The survey's design may have contributed to this problem; a complex and lengthy set of questions was used that posed a burden for respondents. For the average household, the interview alone took about 3 hours. Despite the time investment the survey required, household members were paid only \$2 to participate.

In addition, the data that were collected for the 1987-88 survey may not be accurate because of quality control problems. The survey's design required that equal numbers of households be interviewed over the four seasons to correct for seasonal differences in eating patterns. National Analysts deviated considerably from this design. Quality control problems also resulted from frequent staff turnover. For some new staff, National Analysts provided fewer hours of training than required by the contract. The requirement was meant to ensure that all of National Analysts' staff consistently and correctly collected and processed the data.

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These problems raise doubts about the integrity of the data in the 1987-88 survey. GAO wrote HNIS about these problems during this review. HNIS convened an independent panel to investigate whether the results were biased. The panel concluded that the data may be biased estimates of the nation's dietary intake. Consequently, it did "not recommend use of the data" unless users employed the greatest caution. However, since they are the only current data available on household and individual food consumption, GAO believes it is important that HNIS disclose the data's limitations to the federal agencies and others that rely on the survey to make policy decisions. More importantly, the survey's design flaws need to be corrected before HNIS conducts another nationwide food consumption survey.

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## 1987-88 Survey Contract Was Poorly Managed

HNIS' and FNS' handling of the contract for the 1987-88 survey demonstrates how a federal contract should not be managed. The agencies' mismanagement contributed to cost overruns, delays, and the contractor's failure to complete certain contract tasks.

In administering the contract, HNIS and FNS violated internal control procedures designed to protect the public's interest. In particular, the contracting officer's representative frequently exceeded his authority by directing National Analysts to both forego certain requirements (e.g., a dress rehearsal to test the survey's operations) and undertake work not specified (e.g., 5 months of additional data collection). He did not adequately monitor the contract or relay problems to the contracting officer. After GAO disclosed these management problems, the HNIS administrator relieved the representative of his responsibilities.

The contracting officer failed to monitor National Analysts' contract for an extended period of time. Besides not communicating with the contracting officer's representative, the contracting officer did not follow up on problems discussed in National Analysts' monthly progress reports or on invoices showing that the contractor had spent 75 percent of the budget almost 1 year before the contract was to end. FNS officials currently involved with the contract cited several reasons why the contract was not closely monitored, including a heavy work load, their predecessor's different management style, and the staff's inexperience.

Since 1988, the contracting officer has tried to improve the contract's administration. Although FNS concedes that these efforts were too late, it did not terminate the contract for default after 1988 because that would have delayed the congressionally mandated survey.

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## Recommendations

GAO recommends, among other things, that the Secretary of Agriculture, before requesting funds for another nationwide food consumption survey, submit to the Congress a report (1) demonstrating that efficient survey instruments and procedures have been developed to reduce the burden on respondents, to increase respondents' motivation to participate in the survey, and to meet essential data needs; (2) describing a plan to ensure that the results obtained from the household food use and individual intake data are representative of the U.S. population; and (3) stating the steps to be taken and the quality controls to be followed so that future surveys will not repeat the mistakes of the past.

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## Agency and Contractor Comments

USDA recognizes the reality of many of the problems GAO identified and is taking action to correct them. USDA also agrees with GAO's recommendations. Since USDA's actions will take time to develop and implement, their effectiveness must be assessed in the future. These actions should be described in USDA's report to the Congress.

National Analysts commented that the data from the 1987-88 survey are now under review and meaningful information will be available to government agencies and other users of these data. National Analysts wrote, "Clearly, there were problems using a new data collection method in as demanding and complex a survey as the Nationwide Food Consumption Survey. However, National Analysts attempted to address problems as they arose and performed the requirements of its contract." Contrary to National Analysts' views, the expert panel convened by HNIS confirmed GAO's findings that the survey has serious limitations largely due to the low response rates. Furthermore, as GAO documents in this report, National Analysts did not perform all the contract's requirements.

USDA and National Analysts commented on other more technical aspects of this report. GAO revised the report where appropriate.

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Figure

Figure 2.1: Excerpt From Household Interview Used in  
1987-88 NFCS

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**Abbreviations**

CAPI	computer-aided personal interviewing
COR	contracting officer's representative
EPA	Environmental Protection Agency
FNS	Food and Nutrition Service
GAO	General Accounting Office
HNIS	Human Nutrition Information Service
LSRO	Life Sciences Research Office
NFCS	Nationwide Food Consumption Survey
NRC	National Research Council
OMB	Office of Management and Budget
USDA	U.S. Department of Agriculture

# Introduction

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Several government agencies collect and analyze data to measure food and nutrient consumption and the health and nutrition status of the U.S. population. The U.S. Department of Agriculture's (USDA) Nationwide Food Consumption Survey (NFCS), conducted most recently in 1987-88, is considered a leading government survey in this area.<sup>1</sup> It addresses two aspects of food consumption—household food use and individual food intake. USDA's Human Nutrition Information Service (HNIS) planned and supervised the 1987-88 survey, which was conducted by a contractor, National Analysts.<sup>2</sup>

According to a 1984 National Research Council (NRC) study, NFCS data are important to a multiplicity of users in government, the academic community, and industry.<sup>3</sup> Moreover, according to the study, the survey serves a distinct and important purpose that no other survey currently produced can fulfill. Data from the NFCS answer some basic questions not covered by other surveys, detailing, for example, who in the population consumes what foods. This information is needed not only to assess the nutritional status of the nation but also to design, analyze, or modify a variety of food assistance, education, and regulatory programs. HNIS and another USDA agency, the Food and Nutrition Service (FNS), rely on the data for food assistance programs, an area that received about \$24 billion in appropriations in 1991. HNIS uses the data on low-income households to update the Thrifty Food Plan.<sup>4</sup> FNS uses NFCS data to determine the effectiveness of food assistance programs, to target services, and to estimate the effects of legislative and economic changes. The survey also provides data for other federal activities, such as the Environmental Protection Agency's (EPA) regulation of human exposure to pesticide residues on foods.<sup>5</sup> Because the data are important to many programs, it is critical that the survey be accurate and timely.

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<sup>1</sup>The other major survey is the Department of Health and Human Service's National Health and Nutrition Examination Survey. The third such survey will collect data between 1988 and 1994 from 44,000 individuals on the prevalence of specific diseases and conditions, the dietary intake of individuals, and their health status.

<sup>2</sup>National Analysts is a division of Booz, Allen & Hamilton, Inc.

<sup>3</sup>National Survey Data on Food Consumption: Uses and Recommendations, National Research Council (July 1984).

<sup>4</sup>USDA prepares guides for selecting nutritious diets at different levels of cost. The food plans describe the amounts of different food groups that households can use to provide nutritious diets for their families at four cost levels—liberal, moderate, low-cost, and thrifty. The Thrifty Food Plan is the standard for benefit levels in the Food Stamp Program.

<sup>5</sup>EPA registers pesticides and establishes maximum allowable pesticide residues in or on food. Key elements in regulating safe levels of pesticide residues are the types and quantities of food people eat.

## Background

Under its general mission to promote the food and agricultural sciences, USDA has conducted seven NFCSs, one about every 10 years since 1936. The early surveys covered household food consumption, but in 1965 their scope was expanded to include individual food intake.<sup>6</sup> The Food and Agriculture Act of 1977 (P.L. 95-113) designated USDA the lead agency for research in food and agricultural sciences. HNIS is the agency responsible for conducting applied research in food and nutrition (except for biomedical aspects of human nutrition concerned with the diagnosis or treatment of disease). Most of HNIS' annual appropriations directly support research, analysis, and technical assistance.

The purposes of the 1987-88 NFCS were to evaluate the nutritional content of household and individual diets and to detect shifts in food use since the previous survey. The 1987-88 NFCS comprised a "basic" sample, which was to cover at least 6,000 households of all income levels in the continental United States, and a supplemental low-income sample, which was to cover at least 3,600 households with incomes that were 130 percent of the poverty level or below. On the basis of census figures on average household size, the basic and low-income samples were expected to obtain food intake data from 16,200 and 9,720 individuals, respectively. The samples were to be representative probability samples, evenly distributed over the four quarters of a 12-month period (beginning April 1987) as well as over the days of the week so as to minimize differences in the data due to weekday and seasonal variations in food consumption. HNIS planned to have the 1987-88 NFCS contract conducted between September 1986 and March 1989 at a cost of \$6.2 million. The contract was completed in April 1991, and its final cost was \$7.6 million.

Under the terms of the contract, National Analysts, a commercial survey research firm in Philadelphia, Pennsylvania, was responsible for developing designs for the basic and low-income samples; formatting the final survey questionnaires; collecting data from households, including those that did not respond to the questionnaire; and processing the data from returned questionnaires into final data tapes. Under contracts with HNIS (or its predecessor agencies), National Analysts has conducted several USDA food consumption surveys since 1955, including the 1965-66 NFCS; the 1977-78 NFCS, with supplementary surveys of elderly, low-income, Puerto Rican, Alaskan, and Hawaiian populations; and the two contracts

<sup>6</sup>The most recent NFCS for which complete data are available was conducted in 1977-78. In 1979-80, a supplemental NFCS for low-income households was conducted. The next NFCS is expected to be conducted in 1997-98.

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for the Continuing Surveys of Food Intakes by Individuals in 1985, 1986, and 1989 through 1991.

HNIS and FNS shared responsibility for overseeing National Analysts. HNIS financed the contract with appropriated funds and developed the technical requirements for the contract, specifying all tasks and deliverables, including edited data tapes and operations reports. HNIS was responsible for monitoring the contract and ensuring that it received deliverables as specified in the contract. FNS provided administrative support to HNIS. As the government's business agent, FNS' contracting officer was responsible for negotiating the NFCS contract and ensuring that all terms and conditions were enforced. Thus, HNIS was to notify FNS about any real or potential problems with National Analysts' performance so that appropriate action could be taken to enforce or modify the contract and fully protect the government's interests.

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## Objectives, Scope, and Methodology

In response to a request from Representative George E. Brown, Jr., we examined (1) certain aspects of the 1987-88 NFCS' methodological soundness and (2) the effectiveness of USDA's management of the contractor hired to conduct the survey.

To determine the methodological soundness of the 1987-88 NFCS, we reviewed documents from HNIS and the contractor concerning methodological research on dietary intake surveys and the development of the automated (computerized) method for collecting household food consumption data, the survey's operations, preliminary and final data tapes from the basic sample for individual intake, and documents released to researchers on the data. Because National Analysts had not delivered all data to HNIS at the time of our review, we were able to examine only the data tapes used for the basic sample and the tabulations the contractor prepared for the low-income sample to investigate issues concerning the survey's response rates. We interviewed several USDA and National Analysts officials about the survey's design, sampling and statistical issues, and matters concerning response rates and operations. We reviewed statistical guidance for government surveys and other literature on such topics as automated data collection methods and sources of error in surveys to develop criteria or standards for evaluating the quality of the NFCS. Outside experts in statistical surveys reviewed our drafts.<sup>7</sup>

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<sup>7</sup>Joseph Steinberg, President of Survey Design, Inc. (and consultant to USDA in 1977), and Thomas Jabine, independent consultant.

To assess both the effectiveness of USDA's management of National Analysts and the contractor's performance, we reviewed federal acquisition regulations concerning standards for performance. We reviewed documents at FNS and HNIS, including the solicitation and modifications of the contract, and correspondence both with agency officials and with the contractor. We interviewed current and former HNIS and FNS officials involved with the NFCS contract regarding a wide range of activities and events, including the development, the solicitation, and modifications of the contract; communication between FNS, HNIS, and National Analysts; contract administration; and the contractor's performance. We interviewed National Analysts representatives about various contract matters and obtained documents from them regarding the performance of tasks and the status or outcome of deliverables, such as the follow-up surveys of nonrespondents.

We conducted our review between March and November 1990 in accordance with generally accepted government auditing standards. USDA provided formal written comments on a draft of this report (see app. I). These comments are presented and evaluated in chapters 2 and 3. National Analysts provided formal written comments on an excerpt from the draft report containing factual information (see app. II). National Analysts' comments are presented and evaluated in chapters 2 and 3.

# Poor Methodology Compromised Quality of 1987-88 NFCS Data

Flaws in the methodology of the 1987-88 NFCS, deviations from the original design, as well as lax controls over the collection and processing of the survey's results all raise doubts about the quality of the data obtained. Most importantly, the survey may not be representative of the U.S. population because it had a very poor response rate: About two-thirds of the households in the basic sample did not respond. In the absence of incentives to participate, households may have been discouraged by the length and complexity of the NFCS questionnaire—a problem that had surfaced previously, when National Analysts collected data for the 1977-78 NFCS.

HNIS convened an independent panel of experts to review the integrity of a component of the NFCS data. We had raised concerns about their possible bias during our review. In its April 1991 draft report, the panel wrote that, because the data might be biased, it did “not recommend use of the 1987-88 NFCS data” unless users employed the greatest caution. The panel's findings, which HNIS plans to publish, confirm and describe just how limited the NFCS data are. This information should enable agencies and others to decide if their need for the data and their tolerance for possibly substantially biased estimates outweigh the data's limitations.

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## Survey's Design

The 1987-88 NFCS, largely unchanged from the design of the previous 1977-78 survey, involved lengthy and complex questionnaires requiring extensive information from household members on food consumption and individual food intake. National Analysts began by presenting households with a form letter from USDA explaining the purpose of the survey and asking for their participation. If the household's main meal preparer agreed to participate, National Analysts instructed that person how to prepare for the interview, completed a short series of questions (called a screener questionnaire), and set a time to administer the questionnaire 7 days later.

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## Two Parts of Survey

The survey's household food consumption component, which was conducted first, measured the “disappearance” of foods—that is, the amount of food consumed or disposed of—from home food supplies over a 7-day period. The household's main meal preparer was asked to provide information on 21 food groups (each comprising more detailed categories) used by the household and the cost of that food (see fig. 2.1 for an excerpt for one food group). Questions covered the household's composition, income, and other socioeconomic characteristics, participation

in food assistance programs, and food expenditures and buying practices.

After the household interview was completed, the individual intake component of the survey was administered. All household members (except for boarders, employees, or guests) aged 12 and older were asked to recall the food eaten the previous day. Following that, the interviewer gave each member 2-day records and explained how to fill in the records for foods eaten earlier on the day of the interview as well as the next day. The main meal preparer was asked to complete the form for each child under 12 years old. Records were left for absent members to complete after they were instructed by the main meal preparer. Detailed information was requested on what foods and beverages were consumed and how much, when they were consumed, and whether they were obtained from home or away from home. Examples of acceptable entries are (1) boneless chicken breast, roasted, 1 slice, 2 inches by 1-1/2 inches by 1/4 inches, and (2) 1-1/2-cup scoop of vanilla ice cream with 1 tablespoon of fudge sauce and 1/2 teaspoon of crushed walnuts. The intake forms also asked for information on (1) the consumption of water, fats, salt, and vitamin and mineral supplements and (2) diet and health factors, including food sufficiency, frequency of eating certain foods, smoking, and alcohol use. When the interviewers returned in a few days to pick up completed forms, they were to review them for completeness and detail. Each participant was paid \$2 for completing the 3 days of intake; payment was not to exceed \$20 per household.

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## Quality Controls

Other design features were intended to provide controls over or information about the quality of the survey's execution. For example, the contract required a full-scale "dress rehearsal" in advance of the planned start of data collection in April 1987 in order to demonstrate National Analysts' readiness and to uncover procedural problems that might need correction. All aspects of the survey were to be practiced during the dress rehearsal, from the interviews, using the full household and individual intake questionnaires, to the processing of data to produce final data tapes. The dress rehearsal was to involve interviews with up to 100 households close to Philadelphia that were not part of the nationwide sample.

Chapter 2  
 Poor Methodology Compromised Quality of  
 1987-88 NFCS Data

Figure 2.1: Excerpt From Household Interview Used in 1987-88 NFCS

H. VEGETABLES

1. In the past seven days did your household use any vegetables?  
 2. Did you use any (FOOD CATEGORY)? READ ITEMS IN BOXES. ASK Q's 3 TO 12 BELOW IN ORDER FOR EACH "YES."

		Yes	1
		(SKIP TO "J")	No
			2

<b>ARTICHOKES</b>	<b>OTHER BEANS</b>	<b>CARROTS</b>	55	<b>CRESS</b>	<b>HORSERADISH</b>	<b>MUSTARD GREENS</b>
1 Globe or French	15 Bayo	37 Without tops	56 Watercress	68 Root	81(5) Fresh, trimmed	
2 Jerusalem (sunchoke)	16 Black	38 With tops	57	69 Commercially prepared	82(5) Fresh, bulk, not trimmed	
3 Artichoke hearts	17 Brown	<b>CAULIFLOWER</b>	58		83 Other	
4 <b>ASPARAGUS</b>	18 Calico	39	59(5) Dill, fresh	<b>DANDELION GREENS</b>	<b>KALE</b>	84
5 <b>BAMBOO SHOOTS</b>	19 Fava	40 <b>CELERY</b>	60	70(5) Fresh, trimmed	71(5) Fresh, bulk, not trimmed	85
6 <b>BAKED BEANS (WITH OR WITHOUT FORK OR TOMATOES)</b>	20 Kidney	41 Celery, knob celery	61	72 Other	73 Kohlrabi	86
<b>GREEN BEANS (SNAP, STRING)</b>	21 Mixed	42 <b>CHARD (NEW ENGLAND SPINACH)</b>	62	74 Lamb's quarters	75	87(8) Onion flakes
7 Not trimmed	22 Pinto	43 Chives	63	76	<b>LENTILS, DRY MATURE</b>	88
8 Trimmed	23 Red Mexican	<b>COLLARDS</b>	64	77(5) Green, curly-leaf	<b>LETTUCE</b>	89(5) With tops, fresh
<b>LIMA BEANS</b>	24 Refried beans	44(5) Fresh, trimmed	65	78(5) White, Belgium, French	Headed:	90(5) Without tops, fresh
9 Mature, dry	25 Shallie	45(5) Fresh, bulk, not trimmed	66(4)	79(5) Leaf, Cos, romaine, salad bowl, Simpson, Grand Rapids	Iceberg	91
10(5) <u>Green or immature:</u>	26 <b>BEAN SPROUTS</b>	46 Other	67	<b>MUSHROOMS</b>	Boston, bibb	92
11 <u>In pod, fresh</u>	27 Alfalfa sprouts	<b>CORN</b>			Leaf, Cos,	
12(5) <u>Not in pod</u>	28 <b>BEETS</b>	47 <u>Yellow:</u>			romaine, salad bowl, Simpson, Grand Rapids	
<b>WAX OR YELLOW BEANS</b>	29 Without tops	48 In husk				
13 Not trimmed, fresh	30 With tops	49 Not in husk, on cob				
14 <b>WHITE BEANS (NAVY, PEA OR GREAT NORTHERN, MARROW)</b>	31 <b>BROCCOLI</b>	50 Out off cob				
	32 <b>BRUSSELS SPROUTS</b>	51 Creamed				
	<b>CABBAGE</b>	52 In husk				
	33 Green or white	53 Not in husk, on cob				
	34 Red cabbage	54 Out off cob				
	35 Chinese	55 Creamed				
	36 Savoy					

(Continued)

Quality control procedures for training and supervising survey personnel were to be consistently followed. Standardized training of interviewers and data processing staff is important to reduce errors in responses to questionnaires and in the conversion of responses into quantitative data. Other quality control steps included adhering to data collection procedures to maximize response rates, documenting the number and results of attempts to contact a household, obtaining information about nonrespondents, and documenting data processing procedures for coding responses and entering them into the final data tapes. In addition, interviewers were to be debriefed before they terminated employment so that National Analysts could obtain information about the data collection process and solicit the interviewers' opinions about the data's quality.

Chapter 2  
 Poor Methodology Compromised Quality of  
 1987-88 NFCS Data

Q.3 What (other) type of (FOOD CODE- CODE) did you use? RECORD FOOD CODE HERE. IF NO CODE, DES- CRIBE	Q.4 In what form was the (FOOD ITEM) when you first brought it into the kitchen during the last 7 days? Was it: CIRCLE ONE OR TWO CODES								Q.5 (ASK IF "COMMERCIAL- LY FROZEN OR COOKED" IN Q.4) Was this in sauce or not in sauce?		Q.6 (ASK IF "COMMERCIAL- LY CANNED" IN Q.4) Was this labeled low- sodium?		Q.7 In the past 7 days, <u>altogether</u> how many pounds and ounces did you use? (PROBE: How much did you use?) PROBE FOR # AND TYPE OF UNITS										Q.8 Did you buy the (FOOD ITEM), home produce it, or receive it as a gift or as payment? ENTER CODE	Q.9 (IF BOUGHT) When you bought the (FOOD ITEM) you used, how many pounds and ounces did you buy? PROBE FOR # AND TYPE OF UNITS										Q.10 (IF BOUGHT) What did you pay for the (TOTAL AMOUNT IN Q.9)?	Q.11 (IF BOUGHT) Is that the total price you paid?		Q.12 (IF NO) What does that price represent?	Notes
	Home Frozen Code	Home Frozen Code	Home Canned Code	Home Canned Code	Fresh	Already Cooked Dried or Dehydr.	In Sauce	Not in Sauce	Yes	No	Lb	Oz	Fl Oz	# of Units	Cup (Measuring)	Pint	Quart	Bunch	Peck	Item (Other)	IF BUNCH, ITEM OR OTHER, SPECIFY WEIGHT OR SIZE	1 = Buy 2 = Home Produce 3 = Gift/Pay	Lb	Oz	Fl Oz	# of Units	Pint	Quart	Bunch	Peck	Item (Other)	IF BUNCH, ITEM OR OTHER, SPECIFY WEIGHT OR SIZE	\$XX.XX	Yes	No			
H	1	2	3	4	5	7	8	1	2	1	2				04	08	09	12	15	24								08	09	12	15	24			1	2		
H	1	2	3	4	5	7	8	1	2	1	2				04	08	09	12	15	24								08	09	12	15	24			1	2		
H	1	2	3	4	5	7	8	1	2	1	2				04	08	09	12	15	24								08	09	12	15	24			1	2		
H	1	2	3	4	5	7	8	1	2	1	2				04	08	09	12	15	24								08	09	12	15	24			1	2		
H	1	2	3	4	5	7	8	1	2	1	2				04	08	09	12	15	24								08	09	12	15	24			1	2		
H	1	2	3	4	5	7	8	1	2	1	2				04	08	09	12	15	24								08	09	12	15	24			1	2		
H	1	2	3	4	5	7	8	1	2	1	2				04	08	09	12	15	24								08	09	12	15	24			1	2		

Source: HNIS.

## Methodology of 1987-88 NFCS Was Flawed

Questions about the NFCS' methodology were raised before the survey began in April 1987. In a report on the 1977-78 NFCS, we criticized the use of a long questionnaire that seemed to place an unnecessary burden on respondents and may have jeopardized the quality of their responses.<sup>1</sup> A subsequent study for USDA also raised concerns about the potential for a low response rate, as well as other methodological points.<sup>2</sup> HNIS addressed many of these issues in research projects during the 1980s, but for several reasons left the survey's design basically unchanged. Rather than correcting the problems, HNIS may have added

<sup>1</sup>Nationwide Food Consumption Survey: Need for Improvement and Expansion (CED-77-56, Mar. 25, 1977).

<sup>2</sup>Recommended Survey Design for Validation of Findings of Nationwide Food Consumption Survey, 1977-78, Survey Design, Inc. (Oct. 1977).

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new problems by introducing a poorly developed computerized method of collecting the data.

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## Critiques of Previous NFCS Cited Burden on Respondents

In 1977, we raised concerns about the methodology planned for the 1977-78 NFCS. Among them, the household questionnaire was long, placing an unnecessary burden on respondents that might harm the quality of their responses. We questioned the "list-recall" method of exposing each respondent to a list of a large number of choices in each main food group to aid their recollection when only a small portion of the choices would be relevant. We also reported that for some participants who used all main food groups, having to listen to the reading of up to 350 food categories and then wait for the interviewer to find the code from more detailed subgroups was an unnecessary burden.<sup>3</sup> USDA had not adequately reviewed alternatives, including reducing the number of food subgroups to those with nutritional differences and/or having the interviewer code the data later.

USDA responded in 1977 that we had overestimated the burden of the list-recall method and that the alternatives would be more burdensome and would reduce the validity of the responses. However, USDA asked an outside consultant to recommend ways to improve the quality of future studies. The consultant recommended several research efforts to improve the methodologies for the survey's household and individual intake components. The consultant also raised concerns about reducing the potential for a low response rate. As it turned out, response rates for the 1977-78 survey were low. The contractor's 1980 report showed that only 61 percent of the targeted households participated in the survey<sup>4</sup> (the net individual response rate was 57 percent).

HNIS completed many of the methodological studies the consultant recommended for the survey, though some remain on the research agenda for the future.<sup>5</sup> However, according to HNIS, less methodological research has been done for the household food consumption component or the

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<sup>3</sup>The 1987-88 household questionnaire increased the number of food categories that potentially had to be read to the respondent to 398.

<sup>4</sup>Of 24,408 occupied units, 14,964 households completed interviews.

<sup>5</sup>HNIS has summarized the results of these studies and laid out its agenda for future research in USDA Methodological Research for Large-Scale Dietary Intake Surveys, 1975-88 (Home Economics Research Report No. 49, Dec. 1989).

NFCS as a whole in the last two decades because, in preparation for introducing new surveys, HNIS has been investigating methodologies for collecting individual intake data. HNIS changed its approach to food consumption surveys after the 1977-78 NFCS. In 1985, HNIS began yearly surveys of individual diets in order to obtain continuous estimates of the dietary status of various sex/age groups.

Recognizing that the burden on respondents would be reduced if the household and individual components were separated, HNIS considered this option for the 1987-88 NFCS. However, HNIS rejected separating the components after deciding that the need for information that could be derived only from linked data sets was critical. HNIS considered linked data critical to developing allowances for the Thrifty Food Plan and food stamps.

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### **Computerized Method Was Poorly Developed**

HNIS compounded the flaws in the NFCS' design by prematurely introducing a major methodological change from previous surveys: use of computer-assisted personal interviewing (CAPI), in which interviewers asked the questions from the household questionnaire and entered responses directly into a laptop computer. This method was primarily introduced to shorten the time needed for data processing. According to National Analysts and HNIS officials, many interviewers were not skilled in using the computer and subsequently quit because they were dissatisfied with the CAPI method.

These problems might have been avoided if HNIS and National Analysts had better developed and fully tested the CAPI method before implementation. In 1986, another HNIS contractor, Creative Associates, Inc., pretested an automated version of the household questionnaire on 63 households, using experienced interviewers and cooperative respondents. (This pretest was a scaled-down version of a much larger field test proposed by HNIS in 1985 but rejected by the Office of Management and Budget (OMB) because of its cost.) Results from the pretest alerted HNIS to the need for major revisions, some of which were made for the NFCS. Both interviewers and respondents complained about fatigue because the interview took so long—from 1-1/3 to 5-1/2 hours. Some respondents reportedly refused to finish their interviews because of the length. In addition, the accuracy of both the reported and the recorded data declined as the interview progressed. Interviewers reported anxiety and frustration at not being adequately trained to use the computer and not having enough practice.

The pretest suggested that if the interviewers' concerns were ignored, the turnover in interviewers would be high and the quality of the data low. Nevertheless, HNIS officials believed that the improvements made by National Analysts would address the interviewers' problems. The NFCS contract allowed National Analysts to develop new CAPI procedures using technically superior software and computer equipment. However, National Analysts' development of the CAPI method was not successful in overcoming the interviewers' apparent frustrations with the method. According to a former HNIS official, if major problems were found early on, National Analysts could resort to the traditional "paper and pencil" questionnaire for the entire survey. The HNIS official who oversaw the contractor, however, stated that the contract would have had to be modified if a paper and pencil version were used.

The problems with the CAPI method also might have been averted if National Analysts had had enough time to adequately develop and test its CAPI version of the NFCS questionnaire before data collection began in April 1987. The contractor pretested only two abbreviated versions—though the results of both revealed the same problems that had surfaced earlier, problems that could be overcome only if interviewers were rigorously trained. The scheduled dress rehearsal would have afforded yet another opportunity to discover problems with the CAPI method, but HNIS and National Analysts canceled the dress rehearsal to save time after the contractor had fallen behind schedule.

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## **Data Collection and Processing Were Deficient**

Two major circumstances during the first months of the 1987-88 NFCS led to extensive deficiencies in collecting data and processing the results. First, two-thirds of the targeted households did not provide any individual intake data. Second, many of the contractor's trained interviewers and data processing staff resigned. As a result, the contractor deviated from procedures specified in the survey's design in ways that may have undermined the data's quality.

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## **Response Rates Were Very Low**

One of HNIS' priorities for the 1987-88 NFCS was that the response rates be improved over those of earlier surveys. Under the contract, National Analysts aimed for a 74-percent response rate from households and an 85-percent response rate from individuals within the cooperating households. However, the contractor collected data from far fewer households and their members than originally planned.

Response rates for the NFCS' individual intake component for the basic sample were poor, whether measured by the number of households or the number of individuals that responded.<sup>6</sup> Only 4,114 of 13,733 targeted households provided any individual intake information, or 33.8 percent, excluding vacant units. Thus, for every 100 households targeted, almost 70 had members who did not provide any intake information.<sup>7</sup> An estimated 31.1 percent of the eligible individuals in the sample provided food intake information for at least 1 day, and 25.9 percent for the full 3 days. (See app. III for details on how we calculated response rates.)

Several factors may explain why participation in the survey was low. Steps that might have encouraged respondents to cooperate were not taken. For example, although HNIS' methodological research showed that response rates would improve if sample households were given advance notice of the survey, the contract allowed National Analysts' interviewers to make unannounced visits so that they could more easily arrange their work schedules. Moreover, incentives to participate, such as payment more commensurate with the time required, were lacking. According to HNIS officials, HNIS has been unable to obtain approval from OMB to increase the \$2 payment for participants.

In the absence of compelling incentives, however, the greatest factor discouraging participation may have been the burden the survey placed on respondents. According to one of National Analysts' progress reports, submitted to HNIS during the survey, many households refused to participate solely because of the time required. In March 1988, National Analysts reported to HNIS that the single most significant deterrent to cooperation was that households had to be told beforehand that the survey would involve a lengthy interview. For the average household of about three people, completing the household interview and the first day of intake records required almost 3 hours (no data are available on the time required to complete the remaining 2 days of intake records). HNIS has reported that the time involved in conducting the household

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<sup>6</sup>Because many data were still pending from National Analysts at the time of our review, we were able to obtain complete information only for the individual intake component for the basic sample. We were unable to determine final response rates for the 7-day household food use component for the basic sample or either component of the survey for the low-income sample. However, our analysis of preliminary tabulations from National Analysts showed that response rates were between 33 and 45 percent.

<sup>7</sup>We do not know how many individuals were in the 13,733 households in the sample. To estimate response rates for individuals who provided 1 or 3 days of intake data, we assumed that the average household sizes of both households that participated and those that did not were the same.

and individual components of the 1987-88 NFCS together placed an excessive burden on respondents, which contributed to the low response rates. As a result, HNIS is again considering establishing the individual intake component and the household component as separate surveys. However, HNIS noted that this might affect USDA's development of the Thrifty Food Plan, which requires data from both components.

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### **1987-88 NFCS Results May Be Biased Because of Low Response Rate**

The NFCS was designed to evaluate the nutritional content of U.S. household and individual diets on the basis of an unbiased estimate, that is, a sample that, over repeated surveys, would have the same expected values as the population from which it was drawn. Because National Analysts failed to collect data from many of those selected to be in the sample, however, the possibility exists that the data may not be representative of the U.S. population because those households that did not respond (nonrespondents) may have differed significantly from those that did with regard to the characteristic measured—food consumption.

National Analysts was to develop a profile of nonrespondents through a mail-out questionnaire and interviews with subsamples of (1) households that would not participate in a complete interview, (2) their neighbors, or (3) other proxy sources. The aim of this profile—a standard technique—was to determine whether nonrespondents were systematically different from respondents.

However, in March 1991, National Analysts informed HNIS that the data on nonrespondents were unavailable. According to National Analysts' officer-in-charge, the questionnaire and the documents on the follow-up interviews with nonrespondents were lost during an office move in January 1990, and the data were never entered into a data base. Although she told us that they mailed the nonrespondent questionnaire and conducted interviews sometime in the fall of 1988, National Analysts gave us no documents to substantiate that these tasks were done. In explaining the loss and inattention to the processing of records resulting from these efforts, the officers-in-charge said that the surveys of nonrespondents were the "orphans" of the project.

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### **NFCS Samples Were Not Allocated Over Time**

National Analysts did not adequately implement another key feature of the survey's design: distribution of the household interviews across the four seasons (quarters) of the year to minimize variations in data due to seasonal differences in food consumption. By the end of the first quarter in June 1987, only 638 of the 2,400 interviews expected were completed.

Consequently, HNIS and National Analysts jointly decided to extend the first quarter's data collection into the next quarter (summer 1987). Ultimately, National Analysts' interviewers were simultaneously collecting data across all quarters, regardless of when the household was scheduled to be interviewed under the original design. Rather than adhere to the 1-year data collection plan, National Analysts extended interviewing by 5 months, further disrupting the quarterly design. (See table 2.1.)

HNIS has since adjusted the data by weighting the results differently for each day and month. For example, results for Sunday interviews, which accounted for only 5 percent of the sample, were adjusted upward so that they represented one-seventh, or 14 percent, of the interviews.

HNIS has also reweighted the data using 13 demographic characteristics from the Census Bureau's March 1987 Current Population Survey. Under this weighting scheme, each individual received a weight reflecting that individual's contribution relative to the 1987 U.S. population, with the sum of the weights equal to the total population. At least one individual represented as few as 1,000 persons and as many as 136,000 persons. This large disparity decreased the precision of estimates that could be derived from the 1987-88 NFCS.<sup>8</sup>

**Table 2.1: Distribution of Basic Sample Household Interviews Across Seasons**

Season <sup>a</sup>	Percentage of interviews conducted
Spring (1987 and 1988)	41
Summer (1987 and 1988)	15
Fall (1987)	16
Winter (1988)	28

<sup>a</sup>The months comprising each season were April-June (spring), July-September (summer), October-December (fall), January-March (winter).

<sup>8</sup>Since the NFCS started with a probability sample to develop estimates, each estimate has a measurable precision, or sampling error, which is expressed as a plus/minus figure with a specified degree of confidence. A sampling error indicates how closely we can reproduce from a sample the results that we would obtain if we were to take a complete count of the universe using the same measurement methods. By adding the sampling error to and subtracting it from the estimate, we can develop upper and lower bounds for each estimate. This range is called a confidence interval. Sampling errors and confidence intervals are stated at a certain confidence level. For example, a confidence interval at the 95-percent confidence level means that in 95 out of 100 instances, the sampling procedure used should produce a confidence interval containing the universe value being estimated.

## Other Survey Changes Reduced Quality Controls

National Analysts introduced other design changes after the first quarter, in June 1987, when interviewers had resigned unexpectedly, forcing the company to hire and train new employees.<sup>9</sup> These changes may have jeopardized the quality of the data. According to USDA officials who observed the training of interviewers early in the survey, training on the computer method was inadequate. Both National Analysts and HNIS reported that interviewers had many difficulties using the computer method. These difficulties could have been avoided with better training.

On a related matter, two months into the survey, the training period was shortened to less than 5 days for newly hired interviewers. This fact raises the possibility that new employees were inadequately trained to handle problems or follow standard procedures. Some interviewers began working before being trained on the computer method, and not all interviewers used the computer. Consequently, household interviews were administered differently—most by computer, but some with a printed version of the questionnaire. Three of the five NFCS interviewers we contacted on a nonrandom basis said that they never used the computer to conduct the interview, and one reported having had to administer the printed version without being trained to do so. Differences in administration can change how a question is asked—for example, interviewers may probe differently with a paper questionnaire than with a computerized questionnaire—and can introduce unintended variation in answers. National Analysts also did not document its debriefings of interviewers who quit, as required by the contract. This left gaps in information about how their application of the computer method, for example, might have affected the quality of the data collected.

Quality controls were also relaxed for the data processing staff, particularly coders.<sup>10</sup> This may have jeopardized the quality of the NFCS data. According to HNIS officials, the data processing was poor in quality and was unreasonably delayed. As required by its contract, National Analysts had developed detailed procedures for “post-field” processing of NFCS data. Among these procedures, job applicants were to be screened for certain skills, newly hired reviewers and coders were to receive 5 days of intensive training, and supervisors were to systematically

<sup>9</sup>Of the 240 interviewers who collected individual intake data for the basic sample, 40 percent worked for 3 months or less on the survey. Only 21 percent worked on the survey for more than 1 year.

<sup>10</sup>Transforming qualitative information collected in a survey, like descriptions of foods eaten, into quantitative data for subsequent analysis is called data coding and reduction. Trained coders translate a survey’s qualitative data into quantitative data using established codes and rules.

review and verify the work of each coder to ensure that they applied codes consistently. These procedures were not followed, though details about their implementation are obscure because, according to the contractor, no documentation exists. When a large number of trained coders reportedly resigned or were released because of poor performance, National Analysts subcontracted with temporary employment agencies to fill these positions. The company could not provide us with any details on the number of the temporary coders who worked on the 1987-88 NFCS or their background. National Analysts also replaced the training program it initially used with a mentor system, in which newly hired coders were trained by having them code alongside a more experienced coder until they could perform satisfactorily alone. This variability in both training and supervising large numbers of coders may have decreased the consistency with which individual questionnaires were coded.

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## Assessment of NFCS' Data Quality Problems Is Under Way

In July 1990, during our review, HNIS released the individual intake data for the NFCS basic sample in advance to several federal agencies so that they could analyze the information for policy decisions. However, in the preliminary documentation HNIS gave at least one federal agency, there was no reference to the survey's low response rate other than that it was lower than expected. In August 1990, HNIS also announced plans to publicly release the individual intake data for the NFCS in September 1990.<sup>11</sup>

In September 1990, concerned that HNIS was planning to release NFCS data without the appropriate disclosure of the low response rates, we wrote the Assistant Secretary for Food and Consumer Services that the 1987-88 NFCS data might be substantially biased if the nonrespondents differed from the respondents. We urged that, with all future releases of the data for the basic and low-income samples, HNIS include information on the response rates and a discussion of the data's potential bias. We also suggested how HNIS might investigate the potential bias, since National Analysts had lost the follow-up surveys of nonrespondents.

In response, the Assistant Secretary stated that HNIS would

- assemble an independent expert panel to look at issues pertinent to bias, limitations in the survey's use, and possible remedial actions;

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<sup>11</sup>HNIS releases the data through the National Technical Information Service.

- compare demographic distributions in the NFCS with those in census data using statistical significance tests;
- compare data from the NFCS with those from a comparable national health and nutrition survey conducted in the same period to determine whether they had similar results;
- compare response patterns of respondents contacted on the first attempt with those reached only after several attempts; and
- analyze and publish the results of the follow-up surveys of nonrespondents to characterize those who refused to participate.<sup>12</sup>

In November 1990, HNIS contracted with the Life Sciences Research Office of the Federation of American Societies for Experimental Biology (LSRO) to assess the impact of a low response rate on the dietary (individual intake) data from the 1987-88 NFCS' basic sample and to make recommendations regarding any possible restriction on the data's uses.<sup>13</sup> In December 1990, we briefed the HNIS Associate Administrator on our preliminary findings of potential problems concerning the integrity of the NFCS data. LSRO convened an expert panel in February 1991 to conduct its assessment. HNIS conveyed our findings to the panel for its consideration. LSRO and the panel examined the survey's design and the execution of the NFCS; reviewed HNIS' analyses, such as the comparative studies mentioned by the Assistant Secretary; identified additional analyses necessary to further evaluate the potential for bias due to the low response rate; and delivered a draft report in April 1991 on findings and critical issues regarding the potential bias.<sup>14</sup>

In its draft report, LSRO and the panel confirmed our findings that the survey was poorly executed, that the representativeness of the data was seriously limited, and that these problems needed to be fully disclosed to those who planned to use the survey. For example, the draft report agreed with our finding that the training and the monitoring of interviewers were insufficient. It also stated that the lack of data on

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<sup>12</sup>National Analysts officials stated in writing to us that they had lost all records on the follow-up surveys of nonrespondents and would not deliver these data to HNIS. However, at that time HNIS officials said that National Analysts had told HNIS it was attempting to locate the records. Subsequently, it was evident to HNIS that National Analysts was not likely to deliver these data.

<sup>13</sup>At the time, HNIS did not have LSRO and the panel examine bias in the low-income sample because National Analysts had not yet completed those parts of the survey. HNIS informed us that it is committed to doing so, but would have to decide how to assess the integrity of the NFCS data for the low-income sample.

<sup>14</sup>Impact of Nonresponse on Dietary Data From the 1987-88 Nationwide Food Consumption Survey, prepared for HNIS by LSRO Apr. 1991).

nonrespondents severely limited any attempt to compare the characteristics of respondents with those of nonrespondents. Without information on nonrespondents' food consumption, the report concluded, there was no way to know whether weighting schemes or any other statistical adjustments could account for any differences between respondents and nonrespondents.

The panel also examined HNIS' test of the data's representativeness comparing 13 demographic characteristics with Census Bureau data. The panel found that the NFCS underrepresented "nontraditional families" (for example, the survey included a smaller proportion of men and women from households headed by working females than from households with non-working females). The panel also expressed concern about potential bias in HNIS' reweighting scheme because of its extremely large range and unusual distribution of weights. Since nontraditional families were small in number in the sample, they were heavily weighted. However, the panel wrote, if they were not representative of the population's nontraditional families, severe bias could result.

The expert panel also agreed with our finding that the data might not be representative because of possible bias due to differences between respondents and nonrespondents (nonresponse bias). Its draft report stated, "It is certainly questionable whether or not the data provide unbiased estimates of the nation's dietary intake." As a result, the panel did "not recommend use of the data from the 1987-88 NFCS" unless users employed the greatest caution. It questioned whether the data could be used for several kinds of estimates or analyses (such as estimates of specific foods or food groups, estimates of food intakes by small population subgroups, or trend analyses).

In its draft report, the expert panel concluded, as we did, that HNIS must disclose the survey's limitations in all releases of the data (data tapes) and in all publications reporting the data. The panel specifically urged that "a strongly worded cautionary statement concerning the potential for nonresponse bias" be used. At the time of our review, HNIS informed us that it planned to publish the data's limitations, as described by the expert panel, in one public report. HNIS has prepared a disclosure statement for the data tapes, but plans were not yet completed for disclosing the data's limitations in any technical reports.<sup>15</sup>

<sup>15</sup>As of May 1991, HNIS had planned to publish one report on the household food consumption component of the 1987-88 NFCS and one report on the individual intake component.

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## Conclusions

The low response rate for the 1987-88 NFCS, the poor execution of its design, and the lax controls over the collection and processing of the data all raise serious doubts whether the survey meets its objectives—to evaluate the nutritional content of households and individual diets and detect shifts in food use since the previous survey was conducted.

Nonetheless, the 1987-88 NFCS is the only survey available on household food consumption and individual diets over the last decade. Current data are critical for many users, including federal agencies that provide food assistance and regulate food safety. In our view, establishing confidence in the data will be difficult. HNIS does not have the key information needed to know whether, because of the low response rate and potential differences between nonrespondents and respondents in food consumption patterns, the survey's results are representative of the U.S. population.

Nor does HNIS know the extent of problems with the data. The expert panel convened by HNIS investigated only the basic sample. As yet, no one has scrutinized any of the data for the low-income sample. All data tapes and all publications reporting the data need to disclose the survey's limitations so that federal officials and others can regard the survey critically before relying on it to make policy and program decisions.

Meanwhile, similar problems in future surveys need to be averted. At least since the 1977-78 NFCS was conducted, HNIS has been aware that the lengthy questionnaire used to collect the household food consumption information places a burden on respondents and may discourage them from participating. Easing the burden on respondents and/or providing monetary or other incentives could achieve higher response rates and give those who use the survey greater confidence that the data are representative. Before the next survey in 1997-98, HNIS needs to correct flaws in the survey's design and demonstrate that it can collect data that are timely and high in quality. Otherwise, HNIS will invite a repeat of problems experienced in the 1987-88 survey.

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## Recommendations

To address problems with the quality of the 1987-88 NFCS data, we recommend that the Secretary of Agriculture direct HNIS to

- disclose in all NFCS technical reports limitations that the expert panel finds in the NFCS' basic sample data and

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- assess whether the data for the low-income sample were biased or otherwise poor in quality and, if so, disclose these limitations in all relevant technical reports.

To minimize problems in future surveys, we recommend that the Secretary of Agriculture, before requesting funds for another NFCS, submit to the Congress a report

- demonstrating that HNIS has developed efficient survey instruments and procedures that reduce the burden on respondents, increase households' motivation to participate in the NFCS, and meet essential data needs;
- describing a plan to ensure that the survey's data will be representative of the U.S. population; and
- stating the steps to be taken and quality controls to be followed so that future surveys do not repeat the mistakes of the past.

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## **Comments From the Agency and the Contractor and GAO's Response**

USDA recognizes the reality of many of the problems we identified and is taking action to correct them. Moreover, USDA agrees with GAO's recommendations. (See app. I for details.) USDA expects to publish soon a report on the 1987-88 NFCS' data problems, including the expert panel's conclusions. USDA will also examine, though it has not yet determined how, whether the low response rate biased the low-income data, and will communicate its findings.

USDA has initiated other actions to correct problems in the NFCS' design and methodology. For example, HNIS has signed two interagency agreements under which the U.S. Bureau of the Census will help improve procedures in HNIS' food consumption surveys and assist in a variety of operations for future surveys. USDA agrees that a major reason for the NFCS' poor response rate was the high level of burden on respondents. Officials stated that they are working to reduce this burden in all surveys. USDA canceled the planned 1992 Continuing Survey so that it could focus on incorporating the lessons learned from the 1987-88 NFCS into the planning, design, and execution of other surveys.

USDA's efforts appear to have potential for minimizing problems in future surveys, though we cannot yet evaluate whether they will be effective. Nonetheless, these are matters that USDA needs to fully describe in the report we recommend that it submit to the Congress.

USDA also commented on other more technical aspects of this report. We revised the report where appropriate and have included detailed responses to those comments in appendix I.

Commenting on an excerpt from this report containing factual information, National Analysts wrote that the NFCS data were under review and meaningful information would be made available to government agencies and other users of these data. National Analysts also wrote, "Clearly, there were problems using a new data collection method in as demanding and complex a survey research effort as the Nationwide Food Consumption Survey. However, National Analysts attempted to address problems as they arose...." Contrary to National Analysts' views, the expert panel convened by HNIS confirmed our finding that the survey has serious limitations largely due to the low response rates. National Analysts' poor execution of the survey probably further undermined the data's quality. For example, the training and the monitoring of interviewers were insufficient, and the lack of data on nonrespondents severely limited any attempt to compare the characteristics of respondents with those of nonrespondents. Without these data, there is now no way to determine whether the data are biased.

National Analysts also commented on other more technical aspects of this report. We revised the report where appropriate and have included detailed responses to those comments in appendix II.

# Management of NFCS Contract Was Deficient

FNS and HNIS poorly managed the 1987-88 NFCS contract, at times circumventing key internal controls required to protect the federal government against fraud, waste, and abuse. Contracting and program office officials poorly planned the acquisition and left out specifics in the contract defining the work to be performed and the deliverables due. The contract's administration was so lax that the work National Analysts actually undertook deviated substantially from the original contract's requirements. The HNIS official who was designated the contracting officer's representative (COR) frequently exceeded his authority by directing National Analysts to both forego certain contract requirements and undertake work not specified. The contracting officer remained unaware of the problems for much of the time. When he finally became aware of them, it was too late to reverse the damage done. The original contract's budget—\$6.2 million—was to cover costs between September 1986 and March 1989, when the contract was to be completed. However, between August 1988 and June 1989, the contract's costs increased to \$7.6 million. Completion of the contract was delayed until April 1991.<sup>1</sup>

## Contracting Practices Were Poor

The planning and writing of a contract is important to ensure that the contractor is aware of what is needed and delivers the items on time at a reasonable cost. As the writer and provider of contractual documents, the government is generally held liable for any increased costs or delays the contractor incurs due to defects in a contract. Inadequate planning for the NFCS contract, as well as deficiencies in the contract's specifications, increased time and costs, delayed the delivery of required items, and prevented the performance of contract tasks and the recovery of all the government-owned lap-top computers National Analysts used to collect data.

## Planning Was Inadequate

In several ways, HNIS did not adequately plan the NFCS contract; as a result, various problems occurred early on. For example, the 1987-88 NFCS contract was awarded almost 9 weeks later than HNIS had planned. In its contract solicitation, HNIS planned to allow the contractor a 35-week period following the contract's award to complete various tasks before it started interviewing households in April 1987. However, because of the delay in the contract's award, HNIS reduced the time the

<sup>1</sup>As of May 1991, the NFCS contract was inactive but had not yet been closed out by the government and National Analysts. HNIS was reviewing final deliverables from the contractor to determine whether they were acceptable.

contractor was allotted for these early deliverables from 35 to 26 weeks, rather than extending the date planned for the start of interviewing.

This new time pressure made the contractor's work difficult, as did other delays. For example, although it was not the government's fault, the competing company unsuccessfully protested the contract's award to National Analysts. The protest slowed HNIS' and National Analysts' abilities to proceed for several weeks. Also, HNIS was not ready to work with National Analysts when the contract was awarded and the company was authorized to start work. For example, HNIS needed to give National Analysts codes for foods so that the company could program the household questionnaire and the individual intake food lists by December 1986. HNIS did not give all of the necessary information to National Analysts until after March 1987. HNIS also required National Analysts to prepare printed versions of draft NFCS questionnaires by November 1986. HNIS was to use those documents in applying the same month for OMB's approval of the survey.<sup>2</sup> Although National Analysts delivered the documents on time, HNIS then made revisions that National Analysts had to incorporate. This delayed HNIS' application to OMB. As a consequence, OMB did not receive the application until January 1987. OMB approved the survey in March 1987, 2 months later than scheduled under the contract.

This delay, in combination with the reduced lead-time before data collection was to begin, led to the omission of a major contract task—the dress rehearsal. National Analysts was to conduct the dress rehearsal in January 1987, report the results to HNIS, and incorporate necessary changes in the survey's operations by the time National Analysts was scheduled to start collecting data in April 1987. National Analysts could not conduct the dress rehearsal until its computer programs were complete and OMB approved the survey; consequently, National Analysts and the COR dropped the requirement.

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### **Contract Contained Inadequate Requirements**

The NFCS contract did not adequately identify requirements. For example, the original contract did not name all the deliverables HNIS needed, such as data files on the surveys of nonrespondents, data files containing the screening forms, the handbook for post-field procedures used to process the data, and documents on statistical procedures.

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<sup>2</sup>Under the Paperwork Reduction Act of 1980 (P.L. 96-511), federal agencies must obtain OMB's approval for all surveys involving 10 or more respondents. OMB is allowed up to 90 days to act on each application.

Because of the original contract's vagueness or omissions, HNIS and FNS were confused about what deliverables were due, even though subsequent modifications attempted to specify them. The contract also had to be modified because HNIS more specifically defined the deliverables to "clarify performance issues," according to FNS' contract management branch chief. According to the HNIS official who took over as COR in October 1990, the original contract did not contain all the details because HNIS had assumed that National Analysts would know what was required. She also stated that contracts lacking similar details had been used successfully with National Analysts on earlier food consumption surveys.

The contract also did not contain adequate instructions to control National Analysts' return of the lap-top computers used to administer the questionnaire on household food consumption. As a result of this and the contractor's poor inventory control, government property was lost, damaged, or stolen, or returned long after National Analysts had finished using it. With funds from the contract, National Analysts had purchased 210 lap-top computers for \$338,000. Although the contract stated that these computers would remain HNIS' property, it did not specify how National Analysts would dispose of the property once it was no longer being used or when it was to be returned to HNIS. The contracting office did not review or approve National Analysts' property control procedures, nor did National Analysts adhere to them. Because of other concerns, the contracting office did not ask National Analysts about the computers until March 1989, 12 months after the company was supposed to have finished using the equipment. Seven months later, National Analysts disclosed for the first time that 34 of the 210 lap-tops had been lost, damaged, or stolen. For almost 1 year—between October 1989 and September 1990—the contracting office tried to recover the lap-tops.<sup>3</sup> The contract management branch chief stated that the normal procedure of any government agency is not to dispose of the property under a contract until the contract is ended or until otherwise instructed.

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<sup>3</sup>National Analysts paid FNS \$10,200 for the missing units, based upon FNS' market survey of current value of the units in 1990. The original cost was almost \$55,000.

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## Contract Administration Was Lax

The administration phase of the procurement process begins with a contract's award, continues through the contract's implementation and completion, and ends with final settlement and payment to the contractor. During this phase, the government ensures that the work is done according to the contract's requirements and that the contractor is paid. Although other factors contributed to the survey's delays and cost overruns, deficiencies in the administration of the NFCS contract exacerbated these problems and prevented HNIS from receiving completed contract items. These deficiencies violated internal controls for contracting, which are designed to protect the public's interest.

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## COR Exceeded His Authority

The COR was responsible for monitoring the performance of National Analysts and providing technical assistance. He was not authorized to change the contract's work, costs, or completion dates or to enforce the contract's provisions. This authority was vested only in the contracting officer—as an integral part of internal controls for contracting. However, the COR repeatedly bypassed the contracting officer, interfering with the contracting officer's responsibility for negotiating a fair cost for the work before it was started.<sup>4</sup>

The COR exceeded his authority in several ways. He waived the requirement for National Analysts to deliver computer programs for HNIS' approval by December 1986; HNIS statistical staff were requesting the programs as late as April 1988. He and National Analysts negotiated to drop the requirement for the dress rehearsal. In July 1987, they negotiated the elimination of the seasonal sampling for the household interviews, and with that, dropped requirements for operations reports and data tapes on quarterly progress. In January and February 1988, the COR and National Analysts negotiated a 5-month extension in data collection, beyond the contract's 12-month requirement.

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## COR's Monitoring and Communications Were Poor

The COR, as the contracting officer's eyes and ears, is required to monitor the technical progress of the contractor and, when a problem arises, notify the contracting officer, who can enforce the contract. However, the COR for the NFCS contract poorly monitored National Analysts' performance. For example, until we informed him in August 1990, he said he was unaware that National Analysts had not processed the results of

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<sup>4</sup>As requested by Representative George E. Brown, Jr., our Office of Special Investigations is investigating the 1987-88 NFCS contract to determine whether any conflicts of interest existed between USDA personnel and the contractor and whether charges submitted by the contractor were proper.

the follow-up surveys of nonrespondents before losing the records in a January 1990 office move. He said he did not monitor National Analysts' performance of these surveys in late 1988 and did not know whether the company actually performed the work. Although he said he frequently communicated with National Analysts about the contract, the COR kept few written records and did not document most of the technical guidance and directions that he gave National Analysts.

The COR did not communicate with the contracting officer. The COR did not notify the contracting officer about problems with low response rates or his directions to National Analysts to deviate from the contract's requirements for collecting data. The COR assumed that the contracting officer and his staff read National Analysts' monthly progress reports for details about technical problems.

For a number of years, there were several different HNIS administrators. During most of that time, according to one former administrator, the COR was responsible for the agency's budget and contracts. Two former HNIS administrators said that they were unaware of the COR's role in mismanaging the NFCS contract. These previous administrators told us that they had little or no knowledge of the NFCS' technical requirements and assumed that the COR was responsibly managing the contractor because of his many years of experience. We also discussed the contract's problems with HNIS' associate administrator (who arrived in May 1988 and was acting administrator from November 1988 through April 1990) and informed him that the COR had improperly directed National Analysts to deviate from the contract's technical requirements over an extended period of time and was not adequately monitoring the contract. According to the current administrator (who arrived in May 1990) and associate administrator, the COR's managerial style and lack of recordkeeping had made it difficult for them to learn what was going on with the NFCS contract. However, the associate administrator said that he actively participated in efforts to resolve the contract's problems, including converting the contract to a fixed-price basis in June 1989 to avoid further cost overruns. After we disclosed the management problems described above, the HNIS administrator relieved the COR of his responsibilities in October 1990 and appointed another HNIS official as COR for the NFCS contract.

## Contracting Officer Did Not Monitor the NFCS Contract

The contracting office is responsible for ensuring that all necessary actions are performed so that a contract is effective, for ensuring compliance with the contract's terms, and for safeguarding the interests of the United States in its contractual relationships. During a discussion with FNS officials in August 1990, FNS' contract management branch chief said that when he arrived in early 1988, he recognized that at FNS there was basically no contract administration going on with the 1987-88 NFCS. He also agreed that the COR and the contracting office did not communicate during the contract's critical first 17-month period, though they should have. Lower-level contract specialists assigned to the NFCS contract during this time stated that they did not discuss the contract's problems with the COR. According to the branch chief, these practices are not consistent with the branch's current practices.

The contracting office also did not detect or act on early signs of performance problems. Although the contracting office received National Analysts' monthly progress reports, officials depended on the COR to alert them to any problems. The contracting office also did not investigate why National Analysts had spent 75 percent of the total budget by April 1988, almost 1 year before the contract was to end. Under the limitation-of-cost clause, a contractor is required to notify the contracting officer when the costs the contractor expects to incur in the next 60 days, when added to costs previously incurred, will exceed 75 percent of the contract's funds. Neither the government nor the contractor is obligated to reimburse or incur costs in excess of the estimated costs until the contracting officer acts to increase the contract's budget. National Analysts did not notify the contracting officer until July 1988. The branch chief stated in March 1991 that although the contracting office should have recognized the spending level without the contractor's notification, upon notification, the office took quick action to resolve the issues.

FNS officials currently involved with the NFCS contract agreed that the contracting office's monitoring was poor in the past. The contract management branch chief cited several factors, including a heavy work load of contracts, different management style and operating practices by his predecessor, staff turnover, and the assignment of inexperienced contract specialists. Since his appointment in 1988, he has attempted to resolve problems with the NFCS contract, including changing it to a fixed-price contract to avoid further cost overruns. However, his actions were too late to correct the improper changes in the contract that the COR had allowed. Contracting officials noted that they had no financial leverage to improve performance now because National Analysts had received

most of the payment owed under the contract. Nor was it practical, according to contracting officials, to terminate the contract for default, since that would delay a congressionally mandated study. They also stated that USDA could not recover any of the money paid to National Analysts because of its poor performance. This was partly because the contract was a cost reimbursement type contract, but also because USDA had technically mismanaged the contractor's work. Thus, USDA would probably lose any legal dispute with National Analysts to recover the money.

### Contractor Contributed to Contract's Problems

In addition to negotiating improper changes in the contract work with the COR, National Analysts contributed in other ways to deficiencies in the NFCS contract. For example, since June 1988, National Analysts has been unable to deliver the data tapes and other deliverables on time, despite the fact that five contract modifications incorporated National Analysts' own schedules for delivery. National Analysts also assigned interviewing and data processing staff who were inexperienced, poorly trained, and unable to do the work. It used workers from temporary employment agencies for the data processing, which was not provided for under the contract. By departing from planned personnel assignments, National Analysts lost control of the contract's management early in the project. The project director and assistant project director, who were key personnel responsible for day-to-day management of all operations, cut their hours on the project starting in August 1987. The assistant project director stopped charging hours on the project in November 1987, while the project director left the project in September 1988.

### Conclusions

The mismanagement of the 1987-88 NFCS contract at nearly every stage—from planning to administration—and by all parties concerned—HNIS' COR, FNS' contracting officer, and National Analysts—had deleterious consequences. The contract, scheduled for completion in March 1989 at a cost of \$6.2 million, has had cost overruns amounting to \$1.4 million, and only a portion of the survey's data has been released to date. It is difficult to predict when the complete survey will be available to the public, and as the previous chapter showed, even then its data may be questionable. The delay and poor quality are yet further consequences of the improper changes in the contract that the COR and National Analysts agreed to. Furthermore, in violating internal controls that were in place to safeguard the government's best interests, officials,

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at a minimum, wasted federal funds. More attention is needed in planning and writing contracts so that all requirements are specified and adequate internal controls are identified, for example, in the handling of government property.

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## Recommendations

We recommend that the Secretary of Agriculture direct FNS and HNIS, in contracts for future surveys, to ensure that existing contracting procedures are followed and people are held accountable for carrying out their responsibilities. Particular attention should be given to

- contract planning,
- contract writing,
- compliance with the contracts' terms, and
- contract administration and monitoring by CORs and contracting officers.

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## Comments From the Agency and the Contractor and GAO's Response

USDA recognizes the reality of many of the problems we identified and is taking action to correct them. Moreover, USDA agrees with our recommendations. (See app. I for details.) For example, USDA plans to improve its monitoring of contracts by visiting the contractor's central office weekly, having a formal survey operations team assist the COR, and committing additional staff with in-depth contracting experience. These actions appear to have potential for implementing our recommendation that existing contracting procedures be followed, though we cannot yet evaluate whether they will be effective.

USDA also commented on other more technical aspects of this report. We revised the report where appropriate and have included detailed responses to those comments in appendix I.

National Analysts commented on an excerpt from this report containing factual information. It wrote, "Clearly there were problems using a new data collection method in as demanding and complex a survey research effort as the Nationwide Food Consumption Survey. However, National Analysts attempted to address problems as they arose and performed the requirements of its contract. Contrary to National Analysts' views, this report documents that the contractor did not perform all the contract's requirements. For example, the requirement that National Analysts conduct a dress rehearsal was waived by National Analysts and the COR, not by the contracting officer, as the contract required. National Analysts also did not deliver any data from the required follow-up surveys of nonrespondents. These omissions not only violated contract

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requirements but also had serious negative effects on the quality of the survey.

National Analysts commented on other more technical aspects of this report. We revised the report where appropriate and have included detailed responses to those comments in appendix II.

# Comments From the Department of Agriculture

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



United States  
Department of  
Agriculture

Human Nutrition  
Information  
Service

Belcrest Road  
Hyattsville, Maryland  
20782

May 22, 1991

**SUBJECT:** Comments on General Accounting Office Draft Report RCED-91-117, "FOOD ASSISTANCE: Mismanagement of Nutrition Survey Has Resulted in Questionable Data"

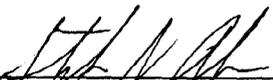
**TO:** John W. Harman, Director  
Food and Agriculture Issues, Resources,  
Community, and Economic Development Division  
General Accounting Office

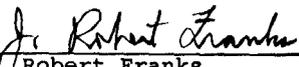
Attached are the Department of Agriculture's comments on the subject report. This attachment reflects the views of all agencies within the Department of Agriculture having responsibilities related to the subject matter of the draft report.

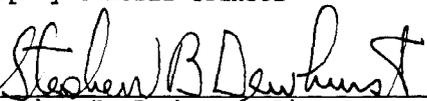
  
Sue Ann Ritchko  
Administrator

Attachment

Approval:

  
Catherine Bertini  
Assistant Secretary for  
Food and Consumer Services

 MAY 23 1991  
J. Robert Franks  
Deputy General Counsel

  
Stephen B. Dewhurst, Director  
Office of Budget and Program Analysis

The Department recognizes the reality of many of the problems identified during the GAO review of the 1987-88 NFCS, and are taking action to correct them. We agree with the recommendations offered by GAO. Section I below highlights these actions.

There are, however, some statements in the draft report that we believe need correction or clarification. Section II below discusses these areas of disagreement.

Section I: Actions Taken by HNIS and FNS to Correct Problems

The GAO review focused on two areas: survey design, methodology, and execution; and contract management. We have taken steps to address weaknesses in both areas.

A. Survey Design, Methodology, and Execution

1. HNIS has signed two interagency agreements with the U.S. Bureau of the Census. One agreement is with the Center for Survey Methods Research. HNIS will be working closely with the Center in assessing and improving procedures in our ongoing Continuing Survey of Food Intakes by Individuals (CSFII). In particular, the Center will be evaluating the survey instruments -- screener questionnaire, nonresponse questionnaire, household and dietary intake questionnaires, instruction booklet, and interviewer procedures -- and making suggestions for improvement. The Center will also be conducting or advising on cognitive and experimental research on technical issues such as portion-size estimation, use of surrogate respondents, and number and spacing of interviews to measure dietary intake.

The second agreement is with the Bureau's Demographic Surveys Division to enlist their help in developing Requests for Contracts regarding sample design and survey management reports; to provide assistance relating to data collection, data processing, and quality control; to advise on evaluations of nonresponse, adjustment for nonresponse, and sample poststratification; and to provide continuing support for HNIS survey operations.

2. In 1988, HNIS signed a contract with the University of Texas to work with us on developing a survey data management system which would a) provide more flexibility in coding food recipes than had been previously available, b) enhance documentation and quality control over existing systems, and c) be available to all potential survey contractors, thus allowing greater competition.

3. HNIS has developed and is putting into place a contract to provide for independent review and evaluation of issues related to USDA's nutrition monitoring activities. This contract will allow us to obtain state of the art, authoritative, independent reviews and evaluations of selected current and emerging issues related to our survey design, execution, analysis, and reporting.

See chapter 2.

4. HNIS has detailed three professional staff members into the Food Consumption Research Branch of HNIS and has specified monitoring our survey contracts and providing quality control for the data as the top priority in the Agency.

5. HNIS agrees with GAO that a major reason for the poor response rate in the NFCS was the high level of respondent burden, due in part to conducting the household and individual surveys together. HNIS is working to reduce the respondent burden in all of our surveys. For example, the USDA Food Plans were originally developed using both individual and household components from the same survey. However, as part of a larger program to re-evaluate our data needs, HNIS is currently exploring alternatives for the development of the Food Plans. This is only one example of our efforts to reduce respondent burden.

6. In February of 1994, HNIS tentatively decided to cancel the 1992 CSFII in order to have the opportunity to incorporate the lessons learned from the NFCS experience and the above research activities into our survey planning, design, and execution. We discussed these plans with our major Federal users, the Food and Nutrition Service, the Food and Drug Administration, and the Environmental Protection Agency. After receiving their concurrence, we further discussed our plans with personnel of appropriate Congressional program committees, with our Appropriations Committees, with OMB, and with non-Federal data users and interested organizations. We believe we have consensus that this plan is acceptable and appropriate and it has now been implemented.

#### B. Contract Management

1. The GAO review identified weaknesses in the performance of the Contracting Officer's Representative (COR) for the NFCS. We believe this may have resulted in part from lack of recent refresher training in the duties and responsibilities of the COR. HNIS has signed a contract to bring such refresher training to all professional HNIS personnel and to provide introductory training to new staff.

2. HNIS has changed its organization to provide that the COR of major survey contracts will not be burdened by other responsibilities, including supervisory responsibilities. The COR is to focus full-time upon monitoring the contract, report directly to the Director of the Nutrition Monitoring Division and have immediate access to the Director.

3. FNS has loaned HNIS a specialist to review the existing contract for the 1989-91 CSFII and to assist in developing the Request for Contract (RFC) for the 1993-96 data collection. This effort is aimed at introducing more and better management controls into HNIS's contract monitoring.

See chapter 3.

4. For the survey currently in the field, the 1991 Continuing Survey of Food Intakes by Individuals, the COR and other senior HNIS staff are making weekly trips to the contractor's central office to monitor progress on the survey and identify problems at an early stage. A Survey Operations Team has been established within HNIS, which also includes representatives from the Census Bureau and the FNS contracts officer, to provide assistance to the COR in monitoring the contract. Team meetings are held on a weekly basis.

5. Additional resources have been committed by FNS to the improvement of the capabilities of the Contracts Management Branch. New staff hired over the past three years have had more indepth contracting experience in all types of contracts. The level of training has been increased and a majority of the staff meet the level III and IV requirements to be warranted under the USDA guidelines requiring at least 400 hours of training. The office has been automated and programs developed to track each contract from the planning stage through closeout. Before the beginning of each fiscal year a contracting plan is developed for the entire year. Each requirement is assigned to a contract specialist who begins working with the COR even before the development of a Request for Contract. A standard procedure has been developed to assist the CORs in preparing their Requests for Contracts. The team concept in contracting is followed throughout the entire life of the contract.

6. Electronic communication between FNS and HNIS has been designed to improve communications on contract matters. Reports are submitted to management on a weekly basis from the automated system along with a summary of concerns which might require their involvement. This has been done with a reduction in the authorized staffing level. Every effort is being made to provide more and better contracting support for managing the agencies' programs.

Section II. Areas of Disagreement Between GAO and HNIS/FNS

1. In the introduction to Chapter 2 and again in the conclusions of that chapter (pp. 13 and 32 of the draft report), GAO stresses the need for HNIS to disclose the limitations of the 1987-88 NFCS in technical reports. HNIS agrees with this recommendation. In the documentation accompanying the survey data tape first released to the public on October 1, 1990, we drew attention to the low response rate and the potential for nonresponse bias and stated that further information would be shared as it became available. We have now completed our in-house studies of the impact of nonresponse and provided the results to the Expert Panel convened by the Life Sciences Research Office under contract with HNIS to examine the integrity and validity of NFCS data.

Now on pp. 12 and 26.  
See comment 1.

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We anticipate publication shortly of our report on nonresponse in the 1987-88 NFCS, which will include summaries of our studies on nonresponse; a review and recommendations by Dr. Wayne Fuller, our statistical consultant; the report of the Expert Panel; and conclusions and recommendations by HNIS.

See comment 2.

The attached two-page statement, "1987-88 Nationwide Food Consumption Survey (Individual Data): Nonresponse Issues," will accompany all releases of data from the NFCS. It has been provided to Federal agencies and researchers who have purchased or been sent the data tape. We plan to respond to requests for data from the NFCS only in written form (mail or fax) and to send the statement along with the requested data.

See comment 3.

2. With regard to GAO's discussion of the design of the NFCS on p. 16 of the draft report, a clarification of the reasons for collecting multiple days of intake information from individuals in HNIS surveys is needed. The scientific community has repeatedly recognized the need for obtaining multiple days of intake for certain purposes. This was reaffirmed in a 1984 report from the National Academy of Sciences that recommended that HNIS continue to collect at least three days of dietary intake data (National Survey Data on Food Consumption: Use and Recommendations," National Academy Press, 1984). Methodological research has shown that data from one day support the reporting only of mean intakes; multiple-day data are necessary to derive estimates of the distribution of intakes among individuals within groups and to capture day-to-day variances in food consumption. Therefore, both the NFCS and CSFII are designed to capture three days of dietary intake data.

Now on p. 16.

See comment 4.

3. The description on p. 18 of the draft report of the list-recall procedure in the household food use component of the NFCS is misleading. GAO implies that the method, used in the 1977-78 and 1987-88 surveys, requires the respondent to listen to the reading of 350 main food groups and subgroups. While these food groups and subgroups appeared on the computer screen (in the 87-88 survey), the interviewer instructions directed them to read only the main food groups and if no foods were used in that group to skip to the next main group. This reduces the burden considerably. Nevertheless, HNIS will reexamine the household food use methodology to determine ways to reduce the length of the interview without sacrificing data quality.

GAO's suggestion to reduce the food items to those with nutritional differences may not be appropriate. Many of the applications of the NFCS data are concerned with food use rather than with nutrient availability. Exploration of possible reductions in the number of food subgroups must consider the needs of the data users and not merely focus on nutritional differences.

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Now on p. 16.  
See comment 5.

4. The draft report, in critiquing the NFCS methodology, twice states (pp. 4 and 19 of the draft report) that the individual response rate in the 1977-78 NFCS was 43 percent, based on a household response rate of 61 percent and a response rate of 70 percent for individuals within households. This is in error: GAO computed the response rate on the assumption that all 44,169 individuals in participating households should have been interviewed. However, the sampling design for the 1977-78 NFCS called for interviewing all individuals only in the first quarter; for the remaining three quarters only 50 percent of adults in multi-adult households were to be interviewed. The number of eligible individuals was thus 32,803 rather than 44,169. Since 30,770 individuals provided usable data, the within-household individual completion rate was 94 percent and the net individual response rate was 57 percent.

Now on p. 15.  
See comment 6.

5. On p. 19, the draft report states that HNIS changed its approach to food consumption surveys following the 1977-78 NFCS. The methodology used for the NFCS 1987-88 was very similar to that used in 1977-78. However, in the decade between these surveys, HNIS introduced the Continuing Survey of Food Intakes by Individuals (CSFII) to respond to the need for yearly or continuous data on dietary status. In the 1985 and 1986 CSFII, following a recommendation from a National Academy of Sciences panel, HNIS surveyed individuals on six nonconsecutive days rather than 3 consecutive days as in NFCS.

Now on p. 17.  
See comment 7.

6. In critiquing HNIS's introduction of computer-assisted personal interviewing (CAPI) in the 1987-88 NFCS, GAO implies (p. 20 of the draft report) that the sole rationale for this innovation was to shorten the time needed for data processing. This goal was explicitly stated in the Request for Proposals because a reduction in data-processing level of effort was expected to be reflected in the proposals submitted by offerors. However, there were a number of additional reasons why HNIS wished to use CAPI. By saving on writing time and paper shuffling, it was expected to reduce the length of the interview. It was expected to reduce the time between the interview and possible callbacks for clarification of responses, thus improving the willingness and ability of respondents to answer callback questions. Most important, it was expected to improve the quality of the data by reducing transcription errors and interview errors such as mis-sequencing of questions, improper application of skip patterns, or recording of erroneous codes. HNIS believes that, while there were indeed some problems with this first attempt at using CAPI, on the whole the use of CAPI has the potential for improving data quality.

Now on pp. 20-21.  
See comment 8.

7. GAO's description (pp. 25 and 31 of the draft report) of the weighting applied to the individual intake data contains several errors. The discussion implies that weights were constructed for day of the week and for each season, and then additional weights were applied to adjust for demographic characteristics. In reality, a single set of weights was constructed based on least-squares theory, such that their use removes any bias that is linearly related to the control variables, which included variables for day of the week and month of the year, the four geographic regions, and for such demographic characteristics as household composition, household income, employment status of the heads of household, race, age, and sex.

In addition, the weights are integers rather than ratios, and their range is 1 to 136. The mean of the weights is 23.5, which should be noted since it is the magnitude of the large weights relative to the average that affects the variance of the differential weight procedure relative to the constant weight procedure. While the use of these weights indeed results in higher overall sampling errors, weight ranges of this magnitude are common in national surveys. The ratio of the maximum to average weight in the 1987-88 NFCS is 5.8; for comparison, it is 6.2 in the March 1987 Current Population Survey and 11.9 in the 1987 National Health Interview Survey.

Now on pp. 26-27.  
See comment 9.

8. On pp. 31-32 of the draft report, GAO recommends that the Expert Panel convened to examine the impact of nonresponse investigate both the basic and low-income surveys. The Expert Panel was asked to examine only the data for the basic sample. This decision was made in the interest of timeliness: HNIS believes that it is critical that the Expert Panel's assessment be made and communicated quickly since many users have urgent needs for the data. Waiting for the low-income data would have delayed an assessment for at least a year. HNIS is committed to examining and communicating the impact of nonresponse on the low-income data, but has not yet determined what mechanism will be most appropriate to obtain this examination.

Now on pp. 29-30.  
See comment 10.

9. The draft report states (pp. 34 and 35) that there was inadequate planning for the acquisition. The file contains evidence of extensive acquisition planning as required by the Federal Acquisition Regulation. The 1987-88 NFCS contract is identified on the Advanced Acquisition Plan for FY 1986. The file contains: a) an approved Acquisition Procurement Plan for this contract dated, March 3, 1986; b) necessary Contracting Officer Determination & Findings dated, April 14, 1986; c) a preproposal conference attended by 12 contractors held on May 16, 1986; d) Office of the General Counsel review dated May 29, 1986, and e) Equal Opportunity Office review dated September 25, 1986.

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Now on p. 29.  
See comment 11.

10. On p. 34, the draft report states that as of January 1991, contract costs had jumped to almost \$8 million (actually \$7.6 million) implying frequent and recent cost increases. The last time additional funds were made available to cover contract costs was June 9, 1989 with modification 5. The procurement was originally solicited, negotiated, and awarded as a Cost Plus Fixed Fee contract. Modification 5 increased contract funding by \$468,929, an amount previously recognized as necessary to complete the contract. This bilateral modification also converted the NFCS contract to Firm Fixed Price specifically to contain costs and avoid additional cost overruns which would accrue to the Government. At that time, all increased cost and funding risks shifted from the Government to National Analysts.

Now on p. 35.

The draft report highlights the fact that a cost overrun occurred. The report should not ignore the root causes: a) the government's requirement to complete the survey and the need to incur all necessary costs to accomplish this objective; and b) the survey and analysis took more work than originally anticipated. On p. 42, the draft report suggests that termination for default was not a practical solution "according to contracting officials ... since that would delay a congressionally mandated study." In fact, the contracting office presented termination for default as a business option for dealing with a contractor who was repeatedly late in meeting scheduled deliverables. This business judgment was overridden by the desire of Congress to receive the information for which the contract was written.

Now on p. 32.  
See comment 12.

11. HNIS agrees with GAO that proper contract management procedures were not followed when the decision was made to drop the planned dress rehearsal (p. 36 of the draft report). However, we believe it is useful to clarify the reasons for dropping this requirement. Survey preparations were delayed for numerous reasons, some of which are attributable to HNIS and others which are not. The survey was scheduled to begin on April 1, 1987. On that date, the dress rehearsal had not been conducted and there was concern that delaying the survey would have increased the cost substantially. The contractor would have had to continue to pay the interviewers and coders that had already been hired or lay them off and hope to rehire them at a later date. The COR believed that the dress rehearsal could be omitted for several reasons: The contractor had turned in a successful performance in the 1985 and 1986 CSFII (individual intake) and the 1984 Puerto Rican Nutrition Survey (household use of food). In addition, the contractor has over five decades of survey research experience including over 20 food consumption research studies. It has conducted research for numerous other Government agencies and has a proven track record. The survey team at National Analysts included the same senior individuals who had successfully directed previous food consumption surveys for HNIS. In retrospect, the decision to drop the dress rehearsal was the wrong decision. However, it was a decision that at the time was made for what was believed to be the best interests of the Government.

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Now on p. 31.  
See comment 13.

12. On p. 37, the draft report questions administrative practices with respect to property management. Instructions regarding property, in the form of required Federal Acquisition Regulation (FAR) clauses, were incorporated into the contract. That National Analysts lost 34 laptop computers is not the result of poor instructions from the government, but rather inadequate handling of the property by the contractor. Additional instructions regarding disposal of property were not required. The normal practice is to recover property at the conclusion of the contract. Full accountability for all government property has been accomplished.

Now on p. 34.  
See comment 14.

13. GAO states that the contracting office is responsible for ensuring that all necessary actions are performed for effective contracting, etc. (p. 40 of the draft report). We agree with this and add the following comment. Although the Contracting Officer has overall responsibility for the contract, it is impossible for him/her to be knowledgeable in the many technical areas for which contracts are written. Survey contracts have many unique features. Methodologies, data, and design requirements are generally outside the specific knowledge of the Contracting Officer. The Contracting Officer must rely on the abilities and skills of the program staffs and more specifically on the Contracting Officer's Representative. In the course of developing contracts, disagreements naturally arise between the Contracting Officer and the program staff over the scope of work, deliverables and other factors. Often the Contracting Officer will defer to the program staff since it possesses the requisite technical knowledge.

Now on p. 34.  
See comment 15.

14. On p. 40, the draft report states that the FNS's contract management branch chief "agreed there was no communication between the COR and the Contracting office during the contract's critical first 17-month period." This is incorrect. The branch chief recognizes that the file does not contain any records of correspondence or conversations pertaining to general contract administration. However, during this time, invoices and other modifications were processed. Extensive contract oversight did take place during 1988 and beyond. The ultimate result of this contracting officer involvement was the recognition of the problems with the contract and the conversion to a Firm Fixed Price contract. This action occurred well before GAO conducted the audit of the National Food Consumption Survey contract.



United States  
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Agriculture

Human Nutrition  
Information  
Service

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1987-88 Nationwide Food Consumption Survey  
Individual Intake Data  
Nonresponse Issues

A. Response Rates

The response rates for the 1987-88 Nationwide Food Consumption Survey (NFCS) were very low, approximately 38 percent at the household level and 31 percent at the individual level. This means that about three of every eight occupied households selected for interviewing were contacted and participated. Within these households, 81 percent of the eligible individuals provided at least one day of intake data.

Household and individual participation results were as follows:

Housing units selected:	13,733	
Occupied housing units:	12,181	(89% of housing units selected)
Contacted households:	9,935	(82% of occupied housing units)
Screened households:	8,450	(69% of occupied housing units; 85% of contacted households)
Participating households:	4,589	(38% of occupied housing units; 54% of screened households)
Individuals in participating households:	12,522	
Individuals completing Day 1 recall:	10,172	(81% of individuals in participating households; estimated 31% of individuals in all occupied housing units)
Individuals completing 3 days recall/records:	8,468	(83% of individuals completing Day 1 recall)

B. Weighting Factors

If respondents and nonrespondents have systematically different behavior, then survey results may be biased. Comparison of individuals who participated in the 1987-88 NFCS with estimates from the Census Bureau's March 1987 Current Population Survey revealed slight underrepresentation of a number of demographic groups, including employed female heads of households and higher-income households. Further, unequal numbers of interviews were obtained in different calendar months and on different days of the week. For these reasons, the data were weighted to yield estimates that match the population distribution of 13 demographic characteristics which are related to food intake behavior and to equalize interviews over months of the year and days of the week. While this weighting is expected to reduce the magnitude of nonresponse bias, it also increases the variance of the estimates.

C. Cautions Regarding Increased Variance of Estimates

For any survey employing a complex sampling design it is recommended that measures of variance be estimated using specialized software (such as OSIRIS, PC/CARP, SUDAAN or SESUDAAN) which takes survey design and weighting into account. This is of particular importance with 1987-88 NFCS data because of the increased variance resulting from the weighting. It is essential that estimates of variance such as standard errors and coefficients of variation be evaluated for all variables of interest.

HNIS policy is to identify estimates for which the coefficient of variation is between 25 and 50 percent and those with coefficients of variation greater than or equal to 50 percent. Estimates with coefficients of variation greater than or equal to 50 percent should not be used or reported alone. We urge that these guidelines be followed by others reporting NFCS data.

D. Cautions Regarding Nonresponse Bias

An independent Expert Panel convened to assess the impact of nonresponse in the NFCS concluded, and HNIS concurs, that it is not possible, based on the information available, to establish the presence or absence of nonresponse bias. However, the likelihood of such bias cannot be disregarded. Nor is it possible to determine objectively the extent to which nonresponse bias might influence interpretation of analyses using these data.

The Expert Panel concluded that between-group comparisons are possible but must be made with the recognition that the respondents may not be completely representative of the subgroups. The Panel also concluded that use of the data for estimates of specific foods or food groups, estimates of upper percentiles of intake, or estimates of intakes of subgroups for which the cell size is small is particularly questionable.

HNIS suggests that users of these data carefully balance their need and the tolerance for error in their specific application against the potential for nonresponse bias in the 1987-88 NFCS dataset. Whenever possible, confirmatory data from other sources should be sought to support estimates based on analysis of these data.

E. Nonresponse Report

HNIS is preparing a report of the nonresponse investigations conducted by HNIS staff. It will include the report of the Expert Panel. Please write to us if you wish to receive a copy of the report when it is published.

The following are GAO's comments on the Department of Agriculture's letter dated May 22, 1991.

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**GAO's Comments**

1. HNIS' action in October 1990 to draw attention to the survey's low response rate in released documents was taken after GAO's recommendation to the Assistant Secretary in September 1990. As we mentioned in the report, we considered HNIS' proposed documents to be insufficient, which is why we wrote the Assistant Secretary raising these concerns and recommending disclosure. See p. 23.

2. In our opinion, the statement that HNIS developed in May 1991 overstates the response rate for households that provided individual intake data. The response rate should be based on the number of households that provided individual intake information, not all households that participated in the survey's household food consumption component. Using the former reduces the household response rate from 38 to 34 percent. Before it is provided to data users, the statement USDA proposes should also include stronger cautionary language regarding use of the data because of their bias.

3. We deleted this information from the report, since a technical discussion of the basis for the chosen methodology was unnecessary to describe the survey's design. USDA's comments on the methodological necessity of multiple-day intake data confirms that higher response rates are important; only one-quarter of the respondents in the NFCS' basic sample provided more than 1 day of intake data.

4. We revised the report to state that some participants who answered positively that they used all of the main food groups (in the 1987-88 survey, there were 21) would have had to listen to the interviewer read a list of up to 398 food subgroups within those major groups. Contrary to USDA's assertion, we are not advising HNIS how to reduce the burden on respondents. We raised this one option—reducing the number of food items to those with nutritional differences—in the 1977 report.

5. We revised the report to include information provided in USDA's comment, specifically, documentation of the 1977-78 sampling plan and individual intake response rate not previously provided to us. To our knowledge however, this description of the individual response rate was not reflected in the contractor's 1980 report or in any other reports on the 1977-78 survey.

6. As stated on pp. 12 and 15 of the report, we agree that the 1987-88 NFCS was very similar to the 1977-78 NFCS.

7. We revised the report to state that the CAPI method was introduced primarily to shorten the time needed for data processing.

8. We revised the report to state that the weighting scheme adjusted for months of the year and several demographic characteristics. Under the adjustment for demographic characteristics, each individual received a weight reflecting that individual's contribution relative to the 1987 U.S. population, with the sum of the weights equal to the total population. At least one individual represented as few as 1,000 persons and as many as 136,000 persons. This disparity decreased the precision of any estimate that could be derived from the 1987-88 NFCS.

9. We revised the report on p. 24 to state that HNIS is committed to examining the impact of the low response rate on the low-income data.

10. We revised the report to reflect deficient planning by HNIS' program office in writing the contract in order to allow enough time for the contractor and HNIS to accomplish various tasks.

11. We revised the report to state that the cost increases in the NFCS contract occurred between August 1988 and June 1989. The report does not ignore the root causes of the cost overruns. To assert that there was a government requirement to complete the survey, citing the "desire of Congress to receive the information" raises an unanswered question: Did USDA notify the Congress of the survey's severe response rate problem (clearly evident in 1987), which meant that the survey's data would be questionable at best and unuseable at worst? To our knowledge, USDA did not raise this issue with the Congress at the earliest time possible, when the Congress could have decided whether to commit additional government funds on a questionable survey. USDA should have informed the Congress about the problems with the survey. Furthermore, we recognize that part of the cause was that the survey and analysis required more work than anticipated. However, the agency's and the contractor's mismanagement during the administration phase (such as unauthorized expansion of data collection efforts) were key reasons why the survey involved more money than anticipated.

12. We believe that USDA's reasons for dropping the dress rehearsal do not adequately consider the drawbacks of not testing the contractor's readiness to perform all aspects of the survey. Without a dress

rehearsal, USDA had no proof, for example, that National Analysts' development of the CAPI method, including preparing interviewers to successfully use the method, was adequate. The problems that were reported with the interviewers' performance using CAPI could have been avoided had a thorough dress rehearsal been conducted and evaluated.

13. The report states that the contractor's poor inventory control was one cause of the loss of the government's lap-top computers. However, we disagree with USDA that the contract contained adequate instructions to control the return of government property. Under the NFCS contract, National Analysts was scheduled to finish using the computers by April 1988, or 1 year before the contract was originally expected to be completed. Subsequent contract modifications extended the contract until April 1991. Under USDA's normal practice, National Analysts would have kept the lap-tops 3 years after they were finished using them. We question the lack of internal controls under the normal practice of leaving valuable government property with a contractor until whatever time the contract is completed, rather than until the task is finished.

The lack of instructions for a more timely return of the property, combined with USDA's and the contractor's lax attention to property control procedures during the contract's administration phase, delayed action on retrieving the computers (and financially recovering for the lost computers) until late 1990. By that time, the current market value of the unreturned lap-tops was much lower than the amount the government would likely have received had action been taken in 1988. It is also possible that more lap-tops would have been returned to the government, since some may have been lost between 1988 and 1990.

14. We generally agree with USDA's comments on the contracting officer's responsibilities and the need to rely on the technical knowledge and skills of the program staff, particularly the contracting officer's representative. However, this does not absolve the contracting officer of responsibility for ensuring things are done right. Because of a contracting officer's limited technical knowledge, it is imperative for the contracting officer to communicate substantively with technical representatives about a contractor's progress and performance. Our report describes inadequate monitoring by FNS' contracting officer and his staff between 1986 and 1988. During this time, when many problems were occurring with the contract, there was essentially no substantive communication between contracting and program office officials on the contract's progress and status.

15. In an August 1990 meeting between three GAO representatives and FNS' contract management branch chief and two of his staff, we discussed our findings that the contracting office inadequately monitored the NFCS contract during a critical period from 1986 well into 1988. Our findings were based largely on direct discussions with the two contract specialists who served for the first 28 months of the contract and on a review of the official contract file. The first contract specialist, who served for 17 months, told us she did not deal with the COR during her tenure. She further stated that, as a contract specialist, she was to place all documentation, including records of phone conversations, concerning the contract into the official contract file. The second contract specialist told us that, except for instructions on processing invoices, she had no regular discussions with the COR until July 1988, when National Analysts notified her office that contract funds were exhausted and almost \$1 million was needed to finish the work. Even so, she reported great difficulty in obtaining necessary information from the COR in order to negotiate the contract's subsequent modifications. Their accounts were corroborated by our review of the contract file, which contained no documentation of any substantive communication about problems with the contract's progress or status between the contracting office, HNIS, or the contractor.

The contract management branch chief did not refute our findings during the August 1990 meeting. Furthermore, he said that when he came to the branch in 1988, he recognized that basically no contract administration was going on with the 1987-88 NFCS contract at either FNS or HNIS. Our report discusses efforts taken by the branch chief after 1988 to improve the NFCS contract's administration, including converting to a fixed-price contract in 1989 to stem further cost overruns. Generally speaking, after 1988, the contracting office's corrective actions were too late to reverse the damage done.

# Comments From the Contractor

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

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MARSHALL G. GREENBERG, Ph.D.  
*President*

May 21, 1991

Mr. John W. Harman  
Director, Food and  
Agriculture Issues  
U.S. General Accounting Office  
Resources, Community and  
Economic Development Division  
Washington, DC 20548

Dear Mr. Harman:

This is in response to your letter of April 15, 1991 regarding a proposed draft of a GAO report (GAO/RCED-91-117) inviting written comments. I have read the excerpt of the proposed report and take exception to the title which is misleading in light of the facts. In the remainder of this letter, I have attempted to shed light on some of the report's inaccuracies on a page-by-page basis.

Generally, the data from the NFCS study are now under review and meaningful information will be available to many government agencies and other users of these data. Clearly, there were problems using a new data collection method in as demanding and complex a survey research effort as the Nationwide Food Consumption Survey. However, National Analysts attempted to address problems as they arose and performed the requirements of its contract. I trust any final report issued by GAO will include the information we are providing.

\* \* \* \* \*

Page 5 -- The statement that "HNIS compounded the flaws in the design of the NFCS by prematurely introducing a major methodological change from previous surveys" implies that there are numerous and significant design problems with the NFCS in addition to computer-aided data collection. This statement is not supported either in the arguments presented in the report, nor by independent review of the NFCS and other surveys using parts of the same methodology that was employed by the NFCS project.

The general design is the same as that employed in NFCS 77/78 and all the supplementary surveys previously cited in Chapter I of the report. Methodological studies prior to both the NFCS 77/78 and the NFCS 87/88 were conducted by USDA to refine and improve the design. Inter-agency and external reviews of the approach were conducted and judged the design to be sound. National Analysts was not aware of any design "flaws" when the research effort was begun.

See comment 1.

Now on p. 17.  
See comment 2.

Appendix II  
Comments From the Contractor

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Now on p. 17.  
See comment 3.

The statement that, "These problems might have been avoided had the CAPI method been better developed by HNIS and National Analysts" suggests that a computer-aided interview program was deficient, a claim which is not substantiated. At the time the NFCS research was requested, a review of the relevant literature showed there was very little published experience available to guide the development of a CAPI interview. National Analysts had its own experience, based on research for USDA to draw upon. Most of the problems identified in that earlier effort (e.g., weight of the "luggable" computer, long printing time for questions to appear) were ones taken into account when the CAPI program was designed. Given the nature and complexity of the survey data to be captured, the program is generally thought to work very well. Presentation of the concept and demonstrations of the interview in action in public forums (e.g., Bureau of the Census Fourth Annual Research Conference -- 1988) has brought positive comments.

Information regarding the pretest by another contractor was not made available to National Analysts in a timely manner. The data quality problems experienced by the other contractor were thought not to be likely to recur because of the differences between their program and the ones employed in the NFCS effort.

National Analysts is in agreement with the statement that some of the problems with the CAPI might have been averted if there had been time to conduct more testing of the NFCS programmed questionnaire and to test the post-field procedures. However the window for extensive pretesting of the CAPI was small according to the original contract schedule and continued to shrink due to factors beyond our control. The set of individual questionnaire items continued to change through late November 1986, thus eroding time available to National Analysts for testing.

Critical data required to program the CAPI were not provided by HNIS until well after the time those data were needed to conduct a dress rehearsal. The food use data were the most important elements in the CAPI questionnaire. In order to program the appropriate contingency questions about the food items respondents reported using, HNIS needed to identify for National Analysts programmers extensive information about the item that existed in the HNIS database (e.g., the form, variation and weight information for the item, a "linkage" code needed to tie the interview data to the nutrient data base). National Analysts noted in its progress reports as late as mid-February 1987, which was many weeks after the data should have been supplied, that "Section II (the food use data) programming continues to be delayed because of the slow delivery of the weight book and NA/USDA linkage information" from HNIS.

Changes in the content of the questionnaire continued to be introduced by USDA and OMB up to three weeks prior to the full-scale data collection effort and less than two weeks prior to the date materials needed to be distributed to the planned interviewer training sessions. Content changes requiring programming work were communicated to National Analysts on February 27, March 2, 3, 5 and 6, 1987. Given the timing and frequency of these changes, there was little time to field test the actual use of the CAPI or of the post-field procedures. Delaying the onset of the national study was not considered an option. National Analysts, as the contractor for this assignment, did not have the latitude to change the start of the data collection period.

Now on p. 18.  
See comment 4.

Page 6 -- The statement that HNIS and National Analysts canceled the dress rehearsal..."after the contractor had fallen behind schedule" suggests that National

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Analysts caused these slippages. This is not a correct interpretation of the situation, for all the reasons stated above. National Analysts reacted promptly to all the input and changes in the questionnaire content which USDA introduced. Moreover, whether or not to cancel the dress rehearsal was not the contractor's decision to make. That was the call of the HNIS.

National Analysts disagrees with the statement that "The contractor changed the survey's design in ways that may have undermined the data quality." The changes introduced were not design changes but procedural changes implemented to deal with problems as they emerged in the field and coding areas. The changes were introduced to combat difficulties and to sustain quality, not to undermine it.

Page 7 – National Analysts agrees with most of the explanation of completion rates offered in the report in this section.

Interviewers repeatedly reported in their regular telephone contacts with the National Analysts' central office field supervisors that the mere perception of the interview burden was discouraging to most respondents. Whether or not the respondents knew the exact length of the interview (which varied from house to house), the fact that they were being asked to do recordkeeping for a week before the interview and to schedule several hours for the interview appointment caused many, in the minds of interviewers, to refuse participation.

The lack of meaningful monetary compensation for respondents' time was the other major problem voiced by interviewers to their National Analysts' field supervisors. It is known from the other studies, including the Continuing Survey of Food Intake by Individuals, currently being conducted by National Analysts for HNIS and which has a significantly higher completion rate, that interviewers find the \$2.00 offer for the completion of the intake records to be of little help in gaining cooperation. In the CSFII, the perceived length of time for the interview is the greatest barrier to participation -- (and the CSFII interview is much shorter than the NFCS) even among those who could not be reached at the time of interview. HNIS made it clear to National Analysts that offering more of a financial incentive to all participants was not possible.

Significant efforts were made to improve the completion rate. These included such activities as:

- Sending letters and making telephone calls to potential respondents from the Philadelphia office
- Providing escorts to interviewers working in difficult areas
- Reassigning sample households to different interviewers for follow-up contact and attempted interviews
- Offering interviewers incentives for timely accurate performance
- Sending letters to managers of locked buildings to solicit opportunities to gain entrance

Now on p. 18.  
See comment 5.

Now on pp. 18-20.

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- Traveling expert interviewers into areas
- Seeking local publicity to promote visibility for the survey and increase interest

Now on pp. 20-21.

Page 9 -- The NFCS interviewing began very slowly and steps were immediately taken to rectify this. National Analysts exerted its best efforts, both to complete as many interviews as possible, and to spread these interviews equally throughout the data collection period to the extent possible. The potential to extend the data collection was an idea first suggested to National Analysts by members of the HNIS site team in a meeting in early September, 1987. National Analysts was anxious to gather as many interviews as possible and, therefore, when it became clear in the Winter quarter that the targeted number of interviews would not be completed by the end of March, it was suggested that the fieldwork period be extended. National Analysts believed this was consistent with HNIS' goals as stated to us earlier, and could help the overall performance even if it would delay the date for completion.

Now on pp. 20-21.  
See comment 6.

The distribution of interviews across the days of the week was approached on a best efforts basis as noted in National Analysts' initial proposal. Sunday interviewing is traditionally less frequent because respondents are less willing to participate in surveys in some areas on Sundays. In its Request for Proposal, USDA recognized this limitation and specified that "not less than 10% of the total completed household food consumption questionnaires (be taken) during each day -- with the possible exception of Sunday." The results of the survey by day of the week are consistent with this requirement. The distribution of interviews from Monday through Saturday shows that each captured more than the 10% minimum that was specified.

Now on p. 22.  
See comment 7.

Page 10 -- The discussion of the issue of interviewer selection and training is misleading. The goal had been to have approximately 200 interviewers working on the project at any given time. National Analysts, however, did anticipate that in a study of this length that there would be turnover. In 12 months, some interviewers would get sick, others would become tired of the study, others would be released in favor of better interviewers. This was expected and planned for. We believe that the computer interviewing, coupled with the demanding nature of the data collection, caused more than the typical amount of turnover to occur. Turnover was about 20% greater than expected, not 50% as the report suggests.

Now on pp. 22-23.  
See comment 8.

Page 11 -- The formal training sessions for interviewers, which lasted 5 days, were designed for large groups of interviewers of between 20 and 25 people. Replacement training was done in smaller groups of 1 to 3 interviewers allowing for considerably more personal attention. All of the same material was covered with the replacement interviewers in these sessions as was addressed in the larger groups. Interviewers in all sessions were trained both in the use of the computer and in the paper-and-pencil questionnaire as the latter was always intended as a backup.

Now on pp. 22-23.  
See comment 9.

The draft report states, "Quality controls were also relaxed for the data processing staff, particularly coders, possibly jeopardizing the quality of the data developed for the NFCS survey." This is not correct. There were numerous sets of checks and edits built into the data processing system from double coding or data entered by junior coders to computerized logic and reasonableness checks. Our initial plans called for five-day training sessions with brand new coders. These types of sessions were tried and found

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not to be effective in bringing coders up to standards. The complexity of the coding and editing responsibility, coupled with the changing nature of the task (the USDA coding system is dynamic and requires constant updating to reflect the current changes in foods available in the marketplace), proved to be beyond the abilities of many clerical personnel. Many clerks resigned from the project during, or shortly after, the formal training sessions. Others were terminated due to poor performance.

Because of high turnover in the early stages of the project, much of National Analysts' coding management time was spent in recruiting and conducting training sessions which were determined to be unproductive. The program was, therefore, changed -- selectively using temporary services to screen candidates according to National Analysts' specifications. National Analysts' personnel conducted all the training and maintained the supervision of these clerical personnel, although they remained on the payroll of the temporary service (a fact that was duly noted in our monthly progress billings to USDA).

Page 12 -- The training of coders was changed in order to improve the retention rate and to improve the quality of their work. Following an abridged training briefing that was adapted to make the coding requirements less difficult to understand, new coders worked directly with more experienced individuals who continued their training, reviewed and corrected their errors and gave immediate feedback. This individualized approach was judged by coding management to be more effective than the initial five-day training.

Page 15 -- The comparison in the footnote between the price paid FNS for the missing used laptop computers in 1990 and the price paid originally in 1986, is definitely misleading. It fails to recognize the dramatic growth and evolution during this time in the laptop market, which led to devaluation of all used computer equipment. The \$300 per unit paid to FNS is the amount specified by the government contracts office in its letter to National Analysts of September 6, 1990. Two vendors of used computer equipment contacted by National Analysts would not even offer a price for the laptops.

I trust this information clarifies some of the issues raised in your report, and that the misstatements will be rectified.

Sincerely yours,



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A Division of Booz • Allen  
& Hamilton Inc.

Marshall G. Greenberg  
President

MGG/hr

Now on pp. 22-23.  
See comment 9.

Now on p. 31.  
See comment 10.

The following are GAO's comments on National Analysts' letter dated May 21, 1991.

## GAO's Comments

1. Contrary to National Analysts' views, the review of the NFCS data by an independent expert panel confirmed our findings that the survey has serious limitations largely due to low response rates.

Furthermore, we disagree that National Analysts performed the requirements of its contract with USDA. As we document in this report, National Analysts did not perform all the contract's requirements (such as the dress rehearsal); nor did the contractor deliver any data from a required follow-up surveys of nonrespondents. The omission of the dress rehearsal is particularly troublesome. According to National Analysts' officer-in-charge and HNIS' former contracting officer's representative, they jointly decided to forego the dress rehearsal. They did this without consulting FNS' contracting officer, who, under the terms of the contract, was the only official with authority to waive requirements.

2. Our chief criticism of the survey is its burden on respondents, a methodological flaw we first identified in our 1977 report on the 1977-78 NFCS. National Analysts clearly agrees with this assessment on p. 3 of its letter, which describes in detail the survey's burden on respondents. The expert panel also found that the NFCS' burden on respondents was very great and that changes in the survey's design to alleviate this might improve response rates in the future.

3. We revised the report to state that the problems with CAPI might have been avoided had HNIS and National Analysts better developed and fully tested the method before implementation. The report does not criticize the concept of the CAPI method for collecting NFCS data. The reasons we report inadequate development of the method are consistent with the account National Analysts gives.

4. In chapters 2 and 3, we discuss USDA's contribution to the "slippages" that led to the cancellation of the dress rehearsal. According to National Analysts' officer-in-charge and HNIS' former COR, it was a joint decision to cancel the dress rehearsal. The issue was never raised with FNS contracting officer. The contracting office is the only official the contract authorized to waive or modify the contract's requirements. Consequently, even if HNIS alone directed National Analysts to forgo the dress rehearsal, National Analysts was not relieved from the contractual requirement to hold a dress rehearsal.

5. We revised the report to state that the contractor deviated from procedures specified in the survey's design in ways that may have undermined the data's quality. As we document in the remainder of chapter 2, these deviations (such as reducing quality controls over the interviewers and data processors and not following prescribed schedules) probably lowered the data's quality.

6. We deleted information in the report on the methodology for sampling households over the days of the week.

7. We revised the report to reflect only that the turnover of interviewers was greater than expected.

8. The evidence in our report substantiates that National Analysts' training of interviewers was inadequate. For example, both National Analysts and HNIS reported that interviewers had many difficulties using the computer method. Reducing the time for training the interviewers may have contributed to this problem. Furthermore, if National Analysts had expected to train small groups of replacement interviewers, its technical proposal should have stated that it planned to shorten the training. It did not do so, and thus, the contract required a minimum 5-day training session for all interviewers.

9. Given National Analysts' past experience conducting the NFCS and Continuing Surveys for HNIS, we question why the company did not know that the rigorous training and monitoring of data coders would be difficult to implement. Instead, National Analysts included rigorous training and monitoring of these staff in its technical proposal, and the training plan was incorporated as one of the contract's requirements, but National Analysts quickly abandoned the plan once the project was under way. This not only violated the contract's requirements, but also changed procedures in a way that may have undermined the quality of the NFCS data. According to HNIS officials, data processing was poor in quality and unreasonably delayed.

10. We do not disagree that the laptops' value depreciated from 1987 to 1990. If the reimbursement had occurred in a more timely manner (that is, when the units were lost, stolen, or damaged between 1987 and 1988), it is likely that the current market value would have been closer to the laptops' original value.

# Response Rates for Individual Intake Data for Basic Sample in 1987-88 NFCS

## Response Rate for Households

The response rate for households for the individual intake component of the 1987-88 NFCS was 33.8% (see table III.1). Thus, for every 100 households expected to participate, fewer than 34 contributed some individual intake information. This rate may differ somewhat once the contractor submits final data for household food use, but should still be low. Our analysis of preliminary tabulations from National Analysts indicates that the response rate for households in the low-income sample was about 45 percent.

**Table III.1: Response Rates for Households Providing Individual Intake Data**

Number of households contractor attempted to reach	13,733
Number of households deemed vacant	1,552
Number of households with occupant(s)	12,181
Number of responding households <sup>a</sup>	4,114
Response rate for households (4,114/12,181)	33.8%

<sup>a</sup>Individual intake information provided for at least one person.  
Source: HNIS.

## Estimated Response Rate for Individuals

As can be expected with any survey, not all individuals within cooperating households participated. The estimated response rate for individuals for the first day of intake was 31.1 percent (see table III.2) Thus, for every 100 individuals, fewer than 32 offered food intake information for the first day. Not all individuals who participated the first day chose to provide all 3 days of intake data (see table III.3).

**Table III.2: Estimated Response Rate for Individuals Providing First Day of Intake Data<sup>a</sup>**

Number of individuals providing data	10,172
Number of individuals in responding households	11,045
Response rate for households (see table III.1)	33.8%
Percentage of participating individuals within responding households (10,172/11,045)	92.1%
Response rate for individuals providing first day of intake data (92.1% X 33.8%)	31.1%

<sup>a</sup>We do not know how many individuals were in the 13,733 households targeted for the sample. Thus, to estimate response rates for individuals, we assumed that the average sizes of both nonresponding and responding households were the same.  
Source: HNIS.

**Appendix III**  
**Response Rates for Individual Intake Data**  
**for Basic Sample in 1987-88 NFCS**

**Table III.3: Estimated Response Rates for Individuals Providing Intake Data for 3 Days<sup>a</sup>**

Number of individuals providing <u>all 3 days</u> of intake data	8,468
Number of individuals providing first day of intake data	10,172
Number of individuals in all households	11,045
Response rate for households (see table III.1)	33.8%
Percentage of individuals within responding households providing first day of intake data (10,172/11,045) (see table III.2)	92.1%
Percentage of individuals providing first day of intake data who later provided data for all 3 days (8,468/10,172)	83.2%
Response rate for individuals providing 3 days of intake data (83.2% X 92.1% X 33.8%)	25.9%

<sup>a</sup>We do not know how many individuals were in the 13,733 households targeted for the sample. Thus, to estimate response rates for individuals, we assumed that the average sizes of both nonresponding and responding households were the same.

Source: HNIS.

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# Major Contributors to This Report

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Postage & Fees Paid  
GAO  
Permit No. G100**

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